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PARTICIPATION RATES AND FUTURE ENROLMENT IN ONTARIO UNIVERSITIES

Prepared by the

Committee on Enrolment Statistics and Projections

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PREFACE

This report on participation rates and future enrolment in Ontario universities, prepared by the Committee on Enrolment Statistics and Projections of the Council of Ontario Universities, is being published at a time when the questions of accessibility to university studies and the adequacy of current government funding have been brought into sharp focus by record-high autumn enrolment at Ontario universities.

Council is releasing the report as a "green paper" with a view to making the discussion of these important issues as well documented and informed as possible. Readers' comments are invited and will be shared with other agencies involved in public policy.

SUMMARY

Two fundamental factors affect university enrolment: changes in the relevant population (demography) and accommodation of demand for access (participation). The relevant demographic factors can be measured with a high degree of accuracy, but the same cannot be said for the factors affecting demand.

Some difficulties in analyzing participation are definitional, e.g., the population base to which participation is related, or the treatment of part-time students. The changing age ranges of students and inter-provincial student mobility add further complications.

If a university system is expanded in proportion to applications for admission, the resulting participation rate is a measure of demand. If, on the other hand, the size of the system is controlled, the participation rate reflects the supply of places.

Wealthy societies generally have the highest participation rates, since wealth is a prerequisite to the provision of mass higher education. Yet beyond this, participation is determined by the interaction of political decisions (supply of places) and individual motivations (demand for access).

In recent years, Canada has ranked second, behind the United States, in its post-secondary (as distinct from university) education participation rate. In 1978-79, excluding out-of-province students, Ontario had a full-time undergraduate university participation rate of 17.4% among the

conventionally defined 18-24 year old age group, the highest rate in the country. Different rates among the Canadian provinces cannot be attributed to regional economic variations, since other structural factors such as the presence of community colleges and the age of entrants are also influential.

In Ontario as in most other jurisdictions the participation rate increased dramatically in the 30 years after World War II. The increase was aided by massive government support for investment in human and physical resources for the university system. This paralleled the growth in public sector employment, which increased demand for university graduates. The most significant increase in the participation rate has been among females. The social goal of equal participation by all socio-economic groups, however, remains unfulfilled.

The perceived state of the labour market for new university graduates can influence both student demand and institutional capacity. But interventionist short-term manpower planning policies have achieved little success, given the volatility of the labour market and the minimum four-year lead time required to complete a programme. Even in periods of economic recession university graduates have a lower unemployment rate than those with lesser levels of educational attainment. Nevertheless, perceptions of employment prospects heavily influence student programme and course choices. Unless current patterns of choice alter radically, limitations on access to high demand job-related programmes may restrict over-all demand.

Following discussion of these factors, Part II of the Report focuses on future enrolment in Ontario to the year 2001. It begins from the evaluation of current employment prospects as an influence on student demand. It is judged, however, that this factor alone is unlikely to produce a long-term significant increase in the participation rate.

Irrespective of the strength of the forecast economic recovery, the more highly educated are likely to be better prepared to function in a rapidly changing job market. Although caring for the aging population is one source of demand, it is hazardous to predict a general resumption of growth in the public sector. In the immediate future the reduction of government deficits will likely have a higher priority than increased spending for education or health.

Demographic projections for a smaller youth cohort will reduce competition for places in the job market. This should produce more job openings for graduates, which will increase demand for university education. On the other hand, good job prospects for immediate employment could attract secondary school graduates directly into the labour force.

The evolution of policies emphasizing greater equality of access among socio-economic groups that are currently under-represented is equally difficult to predict.

At this time (September 1983) concern has arisen over whether the combination of high demand and the effects of many years' inadequate government funding will result in some qualified students being denied a

place at an Ontario university. This could become a major problem over the next few years, but prospects are uncertain.

At present, about 80% of university entrants come to university directly from Ontario Grade XIII. Although it is too early to predict accurately the possible impact, the proposed renewal of the Ontario secondary school curriculum (ROSE/OSIS), which will make it possible for students to complete their secondary schooling in four years, can be expected to put more pressure on universities for places for a period later in the eighties.

In weighing the competing factors outlined above, given that the level of government funding remains a major imponderable, the Committee concluded that it would be unwise to assume any significant change in participation rates. Using 1983-84 estimated participation rates, the Committee has formulated a base enrolment projection, broken down by sex, age and programme status (undergraduate/graduate, full-time/part-time) for use as a benchmark against which to measure projections based on historical minimum and maximum participation rates, and on estimates of the effects of the ROSE/OSIS.

Using a head-count measure, university enrolment is projected under the base scenario to peak in 1984-85 and then decline relatively smoothly by 10% from current levels to a trough in 1999-2000. Taking expected developments in part-time studies into account, on a full-time equivalent (FTE) basis enrolment is projected to decline by 17%. If the effects of the proposed four-year secondary school curriculum are added into the base projection, university enrolment could remain relatively

stable through 1991-92, after which the delayed impact of the demographic change will produce a somewhat steeper decline in numbers.

The report concludes:

> Labour market trends also point to increased demand for education in general and for specialized technological and scientific education in particular. . . . At the same time, improvements in the level of education of the general population should ultimately lead to more demand for advanced education. In other words, pure demand will probably increase. Whether university participation rates decrease depends on the available supply of appropriate places, which are in turn determined by government policies regarding financing, and by institutional capacity to adapt.

CONTENTS

	Page
Preface	i
Summary	ii
Table of Contents	vii
List of Tables and Figures	viii
I. Participation Rates in Postsecondary Education	1
A. Definition and Means of Calculation	1
B. Participation Rates in Other Jurisdictions	5
C. Historical Trends and Conventional Wisdom about Participation Rates	11
II. Future Enrolment in Ontario	26
A. Factors Influencing Future Enrolment	26
1. The Labour Market	26
2. Evolution of Higher Education Policy	29
3. Changes in the Secondary School System	31
B. Future Enrolment in Ontario	32
Appendix: CESP Enrolment Model	38

LIST OF TABLES AND FIGURES

Tables		Page
1	International Postsecondary Participation Rates, Total Postsecondary Enrolment as % of 20-24 year olds	6
2	Participation Rates by Province, Full-Time Undergraduate 1978-79	9
3	Canadian Participation Rates, 1961-1981	12
4	Ontario Universities Participation Rates 1961-1981	13
5	Total Enrolment in Institutions of Higher Education Compared with Population Aged 18-24: United States, Fall 1963 to Fall 1980	14
6	Average Annual Salaries of All Individual Income Recipients and University Graduates 1965 to 1980	21

Figures		
1	Summary of FTE Enrolment	33
2	Summary of Enrolment Projections	34
3	Summary of Full-Time Undergraduate Enrolment	35

I. PARTICIPATION RATES IN POSTSECONDARY EDUCATION

Two fundamental factors affect higher education enrolment - the evolution of a given population (demography) and the extent to which demand within a given population for access to university institutions is accommodated (participation). In doing enrolment projections for the university sector, both demography and participation levels must be considered.

The science of demography is well established as is the range of confidence within which demographers can project variation in the size and structure of a given population. This is particularly true with respect to population projections which underpin university enrolment forecasts, for the large majority of those who will attend university in a twenty year period are already present in the population.

Understanding the factors which have affected and will affect university participation, however, is far more complex. It is for this reason that the Committee on Enrolment Statistics and Projections, in undertaking to examine long term enrolment prospects for Ontario's universities, focuses first on the issue of participation.

A. Definition and Means of Calculation

The rate of university participation is often expressed as the relationship between total university enrolment and the population in the age group traditionally associated with university attendance. In Canada and the United States, the 18-24 year old age range is most commonly used. Other definitions of participation might be based on university enrolment of a given age rather than total enrolment or might take into

account differences in the population for each single year of age, as is done, for example, in recent enrolment analyses by MOSST.[1]

Comparisons over time or among different jurisdictions are complicated by these definitional differences or by inconsistencies in the data used in each part of the ratio. When comparing participation rates, the components of enrolment must be understood: whether full-time/part-time head counts or full-time equivalents are used; whether degree-credit only, or all postsecondary students are counted, including those in correspondence courses or various forms of upper level vocational training. As well, comparisons over time must take account of changes in methods of counting students or in the nature of the constituency being counted. In Ontario for example, beginning in 1969-70, teachers' colleges were gradually incorporated into universities as Faculties of Education, thus including in the university enrolment counts large groups of students who had previously been excluded.[2] Apparent participation rates increased as a result.

Inter-jurisdictional migration of students and changes in the pattern of such migration can also complicate comparison of gross participation rates. In Table 2 (Participation Rates by Provinces), for example, the gross participation rate is generally higher than that for Canadian

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[1] University Enrolment Projections to 2000, MOSST Background Paper #15 (Ottawa: Ministry of State, Science and Technology, 1981).

[2] A. L. Darling, "The Impact of the Participation Rate - Whatever it is - on University Enrolment", Canadian Journal of Higher Education, 10 (1980), 41. The effect on participation rates of similar changes in enrolment counts is discussed in detail in this article.

citizens only, in some provinces by as much as two percentage points.

Since a substantial number of students are outside the traditional age range, participation rates that do not take age differences into account are not strictly comparable with those for earlier years, or for countries having most of their students within a more restricted age range. While nearly 90% of the male and female full-time undergraduate were within the 18-24 age range in Ontario in 1981-82, in all graduate and part-time categories the majority of students were older.[3] In Japan, on the other hand, nearly all university students graduate by age 22.[4] Increased enrolments from a wider age range will automatically increase standard participation rates, even though demand in the traditional age range has not changed.

Changes in the 18-24 age group in the general population will also affect the participation rate, although not the actual demand that the participation rate is intended to measure. Carol Frances attributes part of the decline in the college-going rate of young men in the U.S.

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[3]In Ontario universities in 1981-82 the percentages of students in the 18-24 age range were: full-time male undergraduate - 88.7%; full-time female undergraduate - 89.6%; part-time male undergraduate - 26.3%; part-time female undergraduate - 21.4%; full-time male graduate - 30.6%; full-time female graduate - 33.2%; and part-time male and female graduate - 6.4%.

[4]R. L. Geiger, "The Limits of Higher Education: A Comparative Analysis of Factors Affecting Enrolment Levels in Belgium, France, Japan and the United States," Working Paper of the Higher Education Research Group, Yale University, 1980, p. 29. ERIC microfiche ED 187 187. Geiger's analysis of enrolment trends in Belgium, France and the United States has also been published in "The Changing Demand for Higher Education in the Seventies: Adaptations within Three National Systems", Higher Education, 9 (1980), 255-76.

to the statistical result of declining numbers of young men in the armed forces.

> The published reports of the declining college-going rates for men were based on a count of the civilian noninstitutional population. In the late 1960s, when college-going rates peaked, about 20% of men aged 18-24 were in the military. The number of men in the military declined from 2.2 million in 1969 to 1.0 million in 1978, expanding the civilian population base on which the published college-going rates are calculated. The reported decline in the college going rate of men aged 18-24, from 35.5 percent in 1969 to 27.1 percent in 1978, is cut to a decline from 28.9 percent in 1969 to 25.1 percent in 1978 when the total population is used instead of the civilian population.[5]

A similar statistical phenomenon may be caused by changing interprovincial migration patterns. Leslie points out that besides having a net influx of students or retaining more of its own university students by expanding facilities, a province may experience in-migration of young workers, increasing the size of the 18-24 age group:

> When this happens, even if the number of university enrolments remains constant, the proportion of the 18-24's attending university nonetheless declines. This factor may well have been important in explaining the decline in Alberta's participation rate during the 1970's.[6]

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[5]Carol Frances, College Enrollment Trends: Testing the Conventional Wisdom Against the Facts (Washington: American Council on Education, 1980), p. 31.

[6]Peter M. Leslie, Canadian Universities 1980 and Beyond: Enrolment, Structural Change and Finance (Ottawa: AUCC, 1980), p. 44.

It must be remembered that participation rates in reality measure not pure demand but demand that has been satisfied according to the capacity of a given educational system. Thus historical participation rates reflect a changing interaction between demand and supply. During most of the sixties and early seventies in Ontario, for example, there was an attempt to match the supply of places to the demand for them either by creating new institutions or expanding existing ones. The participation rate was measuring primarily demand which was being stimulated by greater availability of spaces, changing admission requirements, increased financial aid, etc. From the mid-seventies onward, spaces were being limited in an increasing number of programmes and government funding no longer encouraged growth, so that the participation rate was influenced more by supply of places than it had been (Darling, p. 47). Projections of enrolment must take into account the probability of increases or continuing constraint in supply resulting from institutional or government policies which in themselves can either respond to or induce private demand.

B. Participation Rates in Other Jurisdictions

In Table 1, postsecondary (as distinct from university) participation rates for Canada and several other countries are shown along with those for Ontario. Historically, the United States has had the highest participation rates, with Canada in second place. Sweden and more recently Japan are approaching the North American level, while the United Kingdom has comparatively low rates, even when compared with other Western European countries.

Table 1

International Postsecondary Participation Rates
Total Postsecondary Enrolment as % of 20-24 year olds

	1960	1965	1970	1973	1974	1975	1976	1977	1978
Australia	13.1	16.0	16.6	20.1	22.2	24.0	24.9	25.3	25.6
Belgium	9.1	14.8	17.5	20.5	21.0	22.0	23.2	-	25.7
Canada	16.0	26.3	34.6	35.1	34.7	39.0	38.1	37.1	36.8
France	9.8	18.2	19.5	21.8	23.1	24.4	24.6	25.7	24.2
Germany (West)	6.1	8.8	13.4	18.1	19.3	24.5	24.4	24.7	25.6
Italy	6.6	10.7	16.7	21.4	24.0	25.1	26.2	26.8	27.4
Japan	9.5	12.9	17.0	20.0	22.1	24.7	26.2	27.9	29.3
Netherlands	13.2	16.8	19.5	22.2	23.5	25.5	27.0	28.2	28.5
Sweden	9.0	13.1	21.3	21.7	21.8	28.8	31.0	34.8	36.5
Switzerland	6.6	8.4	10.0	12.4	13.2	13.6	14.2	16.0	16.8
U.K.	8.5	11.8	14.1	16.2	16.7	18.9	19.4	19.5	-
U.S.A.	32.1	40.2	49.4	51.5	53.6	57.6	55.5	56.0	-
Ontario	-	-	-	38.7	39.1	40.3	39.8	39.1	38.1

Sources: (National Figures) UNESCO Statistical Yearbook, 1978-79, 1981.

(Ontario Figures) Education in Canada, 1978, 1980 and Statistics Canada Population Estimates.

Generally, postsecondary participation rates are said to correlate with economic and social development as measured by other indicators such as gross national product, per capita income, and standard of living. It is accepted that economic development is advanced by high educational attainment among the population, but the causal relationship is not simply one-way, for only countries that have obtained relatively high standards of living can afford widened opportunities for postsecondary education. Also, the achievement of a good standard of secondary education for the majority of the population is a necessary precondition for high postsecondary participation.

Notwithstanding, significant variations in university participation do occur even among highly developed countries. Switzerland, for example, has an unexpectedly low rate given its ranking in other indicators of economic achievement. Obviously direct comparisons cannot be made without taking into account the structure, standards and outputs of all parts of the educational system in each country, its industrial and occupational structure, and differences in regulations and conventions governing entrance into trades and professions. Clearly, educational policy has as much impact on participation levels as does level of economic development. For example, the streaming process in secondary schools usually determines access to higher education. In the United Kingdom universities have generally retained high standards for admission, while in the United States, postsecondary institutions have been established to serve students with a wide range of academic preparation, and fairly high attrition rates have been accepted. Trow suggests that cultural or class values, apart from simply economic factors or institutional conservatism, continue to constrain the proportion of youth that

go on to higher education in the United Kingdom and other western European countries:

> Involved here are differing concepts of social mobility, and of the role of education in achieving such mobility across generations. It may be that we are seeing one manifestation of the stronger class identifications and structures of European society, which not only have economic and political but also cultural manifestations. And among the latter are these stronger class-linked conceptions of how much and what kind of formal education is appropriate for people in different class positions.[7]

Table 2 displays 1978-79 participation rates for full time undergraduates in Canada. The gross participation rates fall within a wide range with Newfoundland having the lowest rate (11.8%) and Nova Scotia the highest (23.9%). Removing non-Canadians from the enrolment count reduces individual participation rates, as well as the range of difference among provinces. Removing all out-of-province students narrows the range even further, with Newfoundland still the lowest (11.0%) but Ontario now the highest (17.4%). The participation rate thus expressed might be defined as the extent to which a given province accommodates local demand. In terms of the population of a given province attending university anywhere in Canada, the rates change again with Newfoundland at 12.4% but P.E.I. now the highest at 20.3%.

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[7]Martin Trow, "Comparative Perspectives on Access", in Access to Higher Education, ed. Oliver Fulton, Number 2 of the Leverhulme Programme of Study into the Future of Higher Education (Guildford: Society for Research into Higher Education, 1981), p. 94.

Table 2

Participation Rates by Province
Full-Time Undergraduates
1978-79

	(1) Population (18-21)	(2) Full Time Enrolment	(3) Gross Participation Rate	(4) Canadian Enrolment	(5) Canadian Participation Rate	(6) Home Province Enrolment	(7) Home Province Participation Rate	(8) Home Province Enrolment in Canada	(9) Canadian Participation Rate by Home Province
Newfoundland	48,400	5,718	11.8	5,528	11.4	5,321	11.0	6,006	12.4
P.E.I.	10,100	1,390	13.8	1,319	13.1	1,130	11.2	2,055	20.3
Nova Scotia	68,200	16,298	23.9	14,894	21.8	11,141	16.3	12,620	18.5
New Brunswick	58,400	10,450	17.9	9,962	17.1	7,268	12.4	9,583	16.4
Quebec	527,600	71,804	13.6	65,163	12.4	63,364	12.0	71,361	13.5
Ontario	645,800	135,291	20.9	121,455	18.8	112,302	17.4	116,076	18.0
Manitoba	79,500	15,001	18.9	13,481	17.0	12,363	15.6	13,307	16.7
Saskatchewan	76,500	13,128	17.2	12,066	15.8	10,758	14.1	11,657	15.2
Alberta	159,900	27,687	17.3	25,015	15.6	23,159	14.5	25,256	15.8
British Columbia	190,300	26,860	14.1	24,447	12.8	22,736	11.9	25,077	13.2

Differences among provinces with regard to non-Canadian and out-of-province enrolments could affect enrolment trends if policies concerning these students are changed. Ontario, for example, has the highest enrolment of non-Canadians. In addition, 7% of Ontario's enrolment comes from other provinces. Nova Scotia is also a net importer, having 32% of its total university enrolment from outside the province or outside Canada. Obviously any measures that would tend to reduce non-Canadian enrolments, such as sharp increases in visa student fees or strict quotas, would affect gross participation rates for the provinces with larger than average proportions of foreign students. Similarly, a move to higher fees for out-of-province students, as in some U.S. jurisdictions, could change patterns of inter-provincial migration.

Within Canada, from the evidence in Table 2, it would be difficult to attribute differences in university participation only to differences in level of economic development. Indeed, one of the stated principal objectives of Established Programmes Financing is to assure an equal measure of access to higher education for all Canadians. Clearly, some of the differences among provinces result from structural factors. In Quebec, for example, students in the younger age range would be enrolled in the CEGEPs and thus not included in the university-only enrolments used in this table. In Atlantic Canada, on the other hand, the relatively minor role played by community colleges probably results in higher university participation rates. Some of the differences are attributable to the volume and mean age of secondary school output and some, possibly, to the geographic dispersion of universities within a province.

In spite of significant differences in participation rates among industrialized countries and among provinces within Canada, the pattern of enrolment change in the post-war period has been similar in most: rapid growth of participation rates in the 1960s followed by slower growth or even declines in participation in the mid to late seventies, well before a projected decline in the youth population would be expected to lower total enrolments.

C. Historical Trends and Conventional Wisdom about Participation Rates

In Ontario, and in North America generally, participation rates increased continuously during the post-war years, and reached a peak in the mid-seventies. In 1951, full-time enrolment in Canadian universities and colleges was 4.2% of the 18-24 year old population.[8] By 1975, the full-time university participation rate was 12.5% (see Table 3). The participation rate for men increased from 6.7% in 1951 to 15.4% in 1971, and then declined to 12.5% in 1980. The participation rate for women increased from 1.7% in 1951 to 10.5% in 1976 with a subsequent levelling off having occurred. Table 4 shows a similar historical pattern for Ontario participation rates. U. S. participation rates started and have continued at a higher level than those in Canada, but exhibit similar trends (Table 5).

Economic theory and public attitudes following World War II contributed to an increased demand for higher education, and more importantly, to a

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[8]Edward F. Sheffield, Enrolment in Canadian Universities and Colleges to 1976/77 (Ottawa: AUCC, 1966), p. 9.

Table 1

Canadian Participation Rates
1961 -1981

	Total Full-Time University Enrolment			Population 18-24 (000's)			Participation Rates		
	Male	Female	Total[1,2]	Male	Female	Total[1,2]	Male	Female	Total
1961	95,589	33,041	128,630	854.6	858.0	1,712.6	11.2	3.9	7.5
1962	102,987	38,130	141,117	884.8	885.3	1,770.1	11.6	4.3	8.0
1963	113,331	44,629	157,960	924.6	924.2	1,848.8	12.3	4.8	8.5
1964	124,855	52,744	177,599	972.1	969.6	1,941.7	12.8	5.4	9.1
1965	139,920	64,325	204,245	1,020.7	1,018.8	2,039.5	13.7	6.3	10.0
1966	155,747	74,590	230,337	1,092.9	1,098.8	2,191.7	14.3	6.8	10.5
1967	170,477	83,009	253,486	1,146.9	1,141.9	2,288.8	14.9	7.3	11.1
1968	177,199	88,644	265,843	1,211.7	1,202.1	2,413.8	14.6	7.4	11.0
1969	193,018	101,128	294,146	1,267.4	1,254.8	2,522.2	15.2	8.1	11.7
1970	200,710	108,759	309,469	1,316.4	1,307.0	2,623.4	15.2	8.3	11.8
1971	206,626	116,400	323,026	1,345.6	1,343.3	2,688.8	15.4	8.7	12.0
1972	203,548	118,856	322,404	1,371.1	1,358.6	2,729.6	14.8	8.7	11.8
1973	205,698	126,426	332,124	1,406.1	1,393.0	2,799.2	14.6	9.1	11.9
1974	209,771	137,585	347,356	1,453.8	1,437.9	2,891.7	14.4	9.6	12.0
1975	212,086	148,384	371,062	1,493.5	1,481.9	2,975.5	14.2	10.0	12.5
1976	217,467	159,178	376,942	1,528.8	1,517.9	3,046.7	14.2	10.5	12.4
1977	212,878	160,947	374,185	1,574.2	1,554.3	3,128.5	13.5	10.4	12.0
1978	207,203	160,433	367,887	1,620.7	1,589.2	3,209.9	12.8	10.1	11.5
1979	206,767	164,592	371,359	1,664.1	1,621.7	3,285.8	12.4	10.1	11.3
1980	210,944	171,673	382,617	1,686.3	1,636.4	3,322.7	12.5	10.5	11.5
1981[3]	-	-	399,398	1,708.5	1,654.2	3,362.7	-	-	11.9
1982[3]	-	-	428,800	-	-	3,383.5	-	-	12.7

1. Difference due to rounding.
2. Where male plus female does not equal the total, the difference is due to the non-reporting of sex.
3. Preliminary fall enrolment.

Table 4

Ontario Universities Participation Rates
1961-1981

	Total Full-Time University Enrolment			Population 18-24 (000's)			Participation Rates		
	Male	Female	Total[1]	Male	Female	Total[1]	Male	Female	Total
1961	26,813	9,163	35,976	272.2	276.5	548.6	9.9	3.3	6.6
1962	28,811	10,575	39,386	279.5	282.5	562.0	10.3	3.7	7.0
1963	32,050	12,317	44,367	293.3	295.8	589.1	10.9	4.2	7.5
1964	36,436	14,551	50,987	311.4	313.9	625.3	11.7	4.6	8.2
1965	41,759	17,515	59,274	331.4	332.8	664.2	12.6	5.3	8.9
1966	47,923	21,007	68,930	362.8	364.6	727.4	13.2	5.8	9.5
1967	54,777	24,656	79,433	383.1	381.3	764.4	14.3	6.5	10.4
1968	63,289	29,643	92,932	407.6	405.7	813.3	15.5	7.3	11.4
1969	73,112	35,713	108,825	429.4	427.8	857.2	17.0	8.3	12.7
1970	80,048	41,067	121,115	454.8	455.1	909.9	17.6	9.0	13.3
1971	86,774	47,645	134,419	472.2	474.0	946.2	18.4	10.1	14.2
1972	86,115	49,080	135,195	476.9	476.9	953.8	18.1	10.3	14.2
1973	88,581	52,972	141,553	486.5	487.2	973.5	18.2	10.9	14.5
1974	90,788	59,346	150,134	503.5	505.4	1,009.0	18.0	11.7	14.9
1975	94,034	65,667	159,701	516.1	519.9	1,036.1	18.2	12.6	15.4
1976	94,191	69,794	163,985	527.4	530.8	1,058.3	17.9	13.1	15.5
1977	90,460	68,762	159,222	542.5	542.0	1,084.5	16.7	12.7	14.7
1978	87,210	67,186	154,396	558.9	554.0	1,113.0	15.6	12.1	13.9
1979	86,785	67,819	154,604	574.0	563.5	1,137.6	15.1	12.0	13.6
1980	88,795	71,421	160,216	583.6	568.1	1,151.7	15.2	12.6	13.9
1981[2]	-	-	167,126	590.4	569.2	1,159.6	-	-	14.4
1982[2]	-	-	175,900	0.0	0.0	1,163.9	-	-	15.1

1. Difference due to rounding.
2. Preliminary fall enrolment.

Table 5

Total Enrolment in Institutions of Higher Education Compared with Population Aged 18-24: United States, Fall 1963 to Fall 1980

Year	Population 18-24 Years of Age[1]	Enrolment	Number Enrolled Per 100 Persons 18-24 Years of Age
1963	18,268,000	4,765,867	26.1
1964	18,783,000	5,280,020	28.1
1965	20,293,000	5,920,864	29.2
1966	21,376,000	6,389,872	29.9
1967	22,327,000	6,911,748	31.0
1968	22,883,000	7,513,091	32.8
1969	23,723,000	8,004,660	33.7
1970	24,687,000	8,580,887	34.8
1971	25,779,000	8,948,644	34.7
1972	25,913,000	9,214,860	35.6
1973	26,397,000	9,602,123	36.4
1974	26,916,000	10,223,729	38.0
1975	27,605,000	11,184,859	40.5
1976	28,163,000	11,012,137	39.1
1977	28,605,000	11,285,787	39.5
1978	28,971,000	11,260,092	38.9
1979	29,285,000	[2]11,569,899	39.5
1980	29,462,000	[2]11,940,000	40.5

[1]Bureau of the Census estimates as of July 1 preceding the opening of the academic year, includes Armed Forces overseas.

[2]Estimated.

Note: While 18 to 24 is frequently considered to be the usual age for college attendance, an increasing number of students in recent years have been outside this age group. According to a sample survey conducted by the Bureau of the Census in October 1979, 2.7 percent of the students were under 18; 45.7 percent, 18 to 21; 15.8 percent, 22 to 24; and 35.8 percent, 25 or over.

Sources: (1) U.S. Department of Education, National Center for Education Statistics, Fall Enrolment in Higher Education. (2) U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, Nos. 519, 704, 721, and 870.

From: Digest of Education Statistics (1981) p. 90.

willingness on the part of government to provide facilities to meet that demand. By the 1950's, both Canada and the United States were enjoying substantial and sustained economic growth. Human capital theory supported the need for both public and private investment in education. Demand for university-trained manpower appeared almost limitless, and business, government and the public were united in their desire to give the post-war generation opportunities their parents did not have. Western societies made larger commitments to public services and to the political management of the economy, leading to very substantial growth in health services, social welfare, town and regional planning and other areas employing university graduates. In 1947, 11.9% of all employed Canadians were in public sector jobs, including teaching. Total public sector employment increased to 17.0% in 1961 and to 19.3% in 1975.[9]

The post-war baby boom led, in particular, to unprecedented job opportunities throughout the education sector. As happened with many other professions and occupations, academic qualifications for elementary and secondary teachers were upgraded. In Ontario, the Minister's Committee on the Training of Elementary School Teachers recommended in 1966 that by approximately 1975 all elementary teachers have degrees, and that teacher training be placed within the universities (Darling, p. 41). This had three major impacts on enrolments. As we have seen above, the function and enrolments of the teachers' colleges were gradually

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[9]David K. Foot and Percy Thadaney, "The Growth of Public Employment in Canada: The Evidence from Taxation Statistics 1946-1975", in Public Employment and Compensation in Canada: Myths and Realities, ed. David K. Foot (Toronto: Institute for Research on Public Policy, 1978), Table 3.2, p. 47.

absorbed into the universities. The bachelor's degree requirement led to increased enrolment, particularly in general arts and science programmes, of students who previously would have only attended a teachers' college. At the same time, teachers who were already working studied part-time to satisfy the new requirements in order to maintain certification or earn salary increases.

In the United States, the launching of Sputnik in 1957 was another incentive to expand the highly qualified labour force, and generous financing was made available for all forms of higher education. A strong commitment to education as a means of ensuring economic and social advancement was also prevalent in Canada. An Economic Council of Canada study reviewed the evidence of the human capital theory, and concluded that differences in productivity between the United States and Canada could be lessened through education:

> Estimates have shown that better education appears to have raised labour earnings per man by about 30 per cent from 1911-61 in Canada, and that this has contributed almost one quarter to the rise in output growth per employed person. However, this represents merely about one half of the comparable achievement in the United States, reflecting the widening gap in the average level of schooling in terms of economic growth. It was also estimated that about one third of the income difference per man, prevailing in the two countries at the beginning of the 1960's, appears to have been the result of lower Canadian educational attainments. The major policy implication is that increasing efforts in the area of education are a prerequisite not only for the maintenance or acceleration of productivity growth in Canada, but also for the narrowing of the existing differences in the absolute level of productivity, and therefore the living standard,

between Canada and the United States.[10]

In the sixties, sociological theory held that education or lack of it was a major determinant of income and class distinctions. Improvements in education at all levels were supported as the best means of providing more opportunity for the disadvantaged. Attempts were made to widen access to postsecondary education for groups that historically had been denied it: first academically able high school graduates from lower income families, and later, particularly in the United States, members of minority groups. Open access policies at public institutions in the United States, often accompanied by relaxation of traditional standards and provision of remedial programmes, allowed students who previously would not have been considered qualified an opportunity to enrol in some form of postsecondary education.

Changes in educational philosophy led to less rigid requirements for the completion of secondary education. In Ontario, the requirements for the Honour Graduation Diploma dropped from eight credits before 1966 to six credits in 1971. Similarly, the abolition of departmental examinations in 1968 increased the number of students qualified for university admission (Darling, p. 43).

However, efforts to improve accessibility for lower-income students have been accompanied by another phenomenon: increased participation by children of the middle class. The result has been that university

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[10]Gordon W. Bertram, The Contribution of Education to Economic Growth (Ottawa: Economic Council of Canada, 1966), p. 62.

enrolments still have a higher representation from the more advantaged socio-economic groups. Edwards finds that the greater part of the expansion of enrolments in European higher education from 1955-70 came from the same leading socio-cultural classes which had always dominated it. These groups both increased in absolute numbers during this period and increased their participation rates:

> The relative slow down in student enrolments since 1970 is therefore to be explained not by any new demographic factor nor by some mysterious disillusion with the value of higher education. The absolute participation from the leading sector which during the 60s had been compounded of two factors, firstly its continued growth as a proportion of the population and secondly by a once for all acceleration of its participation rates to their logistic limit, now reverted to the former factor only.[11]

While growth in university participation rates in total tended to stabilize during the seventies, there was considerable variation by gender, level and type of enrolment. Statistics Canada enrolment data for Canadian universities in 1970-71 and 1979-80 document significant changes that have taken place since the beginning of the seventies. Male undergraduate full-time enrolment increased by only 1% during this period, compared with 46% for females in the same category. Male full-time graduate enrolment declined by 9%, while that for females increased by 81%. In the undergraduate part-time category, male enrolment increased by 43% and female, by 160%, while part-time male and female graduate enrolment increased by 76% and 234% respectively. Despite

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[11]E. G. Edwards, "An Analytical View of Trends in Student Enrolments in Western Europe", Higher Education in Europe, Vol. VI, No. 3 (1981), 55.

these changes, in Canada there are more men than women in all university enrolment categories except undergraduate part-time.

In the United States, the college attendance rate for 18-24 year olds declined slightly after steady increases until the mid-seventies. The participation rate for men dropped while that for women continued to increase. In 1978 more women entered the freshman class than men.[12]

The perceived state of the labour market for new university graduates can influence both private demand and institutional capacity to meet demand. Freeman attributed declining participation rates for white American males in the seventies to a market response to lower returns on private investment in education, as measured by life-time earnings based on relative wages for high school and university graduates during this period.[13] Besides providing an explanation for the direct effect of private demand on participation rates, cost/benefit analysis using earnings of recent graduates has been used to support policy changes that ultimately determine the supply of places in universities. The 1981 Dodge Report concluded from evidence of Canadian and foreign cost/benefit analysis:

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[12]Lyman A. Glenny, "Demographic and Related Issues for Higher Education in the 1980s", Journal of Higher Education, 51 (1980), 366.

[13]Richard B. Freeman, "Overinvestment in College Training?" Journal of Human Resources, 10 (1977), 287-311.

> that the overall size of the post-secondary sector is too large and . . . could be contracted somewhat, with resources modestly reallocated from education, general arts and sciences and social work to engineering, business, economics and technology.[14]

Thus, the apparent decline in private return from higher education and perceptions of a less advantageous job market for new graduates are cited by governments reluctant to make capital investments generally, human as well as tangible. Table 6 shows the changing relationship between salaries for university graduates and for all income recipients in Canada during this period. The apparent shift is misleading, since we suspect that the reduction in the ratio results largely from a major infusion of university graduates into the population during the past decade. Since the infusion comprised young persons, more of those reported as university graduates were just starting their careers and had not realized their full earning potential. Further, it should be noted that the apparent decline on private returns to investment in university education was taking place in a time of generally rising unemployment, when youthful labour force entrants, regardless of education, had difficulty obtaining their first jobs.[15] Further, notwithstanding the matter of relative earnings, compared to those with only high school education, university graduates were still in an advantageous position. Still, the incorrect perception that university

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[14] Labour Market Development in the 1980s (Ottawa: Employment and Immigration Canada, July 1981), pp. 154-155.

[15] See also Paul Davenport, "Federal Funding of University Education", in Financing Canadian Universities: For Whom and By Whom?, ed. David M. Nowlan and Richard Bellaire (Toronto: Institute for Policy Analysis, 1981).

Table 6

Average Annual Salaries of All Individual Income Recipients and University Graduates 1965 to 1980

	(1) All Income Recipients	(2) University Graduates	(2)÷(1)
1965	$3,579	$8,013	2.24
1967	4,222	7,853	1.86
1969	4,710	9,843	2.09
1971	$5,371	$12,065	2.25
1972	5,828	11,532	1.98
1973	6,416	13,342	2.08
1974	7,416	14,264	1.92
1975	8,208	15,460	1.88
1976	$9,265	$17,973	1.94
1977	9,747	17,222	1.77
1978	10,673	18,800	1.76
1979	11,599	20,625	1.78
1980	12,817	22,310	1.74

Source: Income Distributions by Size in Canada, Statistics Canada (13-207), 1965-1980.

Notes: Prior to 1971, data were published on a biennial basis. For 1965 and 1967, the category "university graduates" includes those individuals who attended university for 1 or more years.

education was a less reliable investment for either the individual or the society probably contributed to the late-seventies enrolment decline.

In a study of changes in participation rates in Belgium, France, the United States and Japan, Ronald Geiger[16] identifies three interacting factors that produced the stagnation of participation rates in most industrialized countries in the 1970's:

1. declining labour market opportunities for graduates;
2. a perception of the failure of higher education to ameliorate the inherent inequalities of social structure;
3. the evolution of academic achievement as developed in secondary school, which interacts with social position in a variety of ways to determine the likelihood of enrolment in higher education.

In each country, because of differences in structure and standards within their respective educational systems, these general factors have acted to stabilize participation rates at different levels. In Belgium, for example, the high level of achievement required of university preparatory programmes and by Belgian universities themselves seems to have been the principal restraint upon demand. On the other hand, French universities which are less academically rigorous have experienced a similar stagnation of growth. There, most demand from the universities' traditional clientele of higher SES students has already

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[16]The following section summarizes Geiger's 1980 working paper, "The Limits of Higher Education", note 4, above.

been met, while the poor job market for graduates, particularly from arts, social sciences and law have made the universities less attractive for lower SES students.

Geiger sees somewhat similar factors affecting participation rates in the United States. He suggests that the participation rate of higher income and higher ability students has already reached the limits of academic potential within this group, while more marginal students, particularly from lower income groups, are less willing to invest in the kind of education that yields uncertain returns. As a result, these students appear to be reducing their investment in higher education by enrolling part-time or in two-year colleges.

The Japanese have been very successful in improving achievement in the lower schools, and had a rapid expansion in university enrolments in the sixties and early seventies. Currently 90% of an age cohort graduates from high school, compared to 75% for the U.S. (p. 29). In 1960 Japan had a university participation rate about equal to France, but by 1975 it was approaching that of the U.S. Growth in enrolment leveled off, however, in the last half of the seventies, because of the same combination of factors as in other countries: the interactions of career incentives, ability and SES. In addition, there has been a deliberate government policy to constrain enrolment growth.

In Canada, a decline in public sector employment opportunities, particularly in education, is seen to have restricted opportunities for graduates in education, general arts and science, social science and humanities, the disciplines that had experienced most rapid growth in

the sixties.[17] Because they could no longer easily obtain teaching or civil service positions, more and more graduates from non-vocational programmes were competing for the limited number of entry-level business jobs that were suited to the non-specialist. Having more potential candidates for these positions, employers were increasingly able to demand more specific kinds of educational preparation. Increased participation of women both in higher education and in the labour force meant that more women were entering the competition for the same jobs as men with similar qualifications. While employment opportunities were still good for graduates of professional programmes, entry into these was restricted.

Perception of a more limited job market probably affected potential students in different ways. Academically able students from families that viewed university education as the only acceptable preparation for a career competed for places in restricted entry professional programmes, or chose still unrestricted job-oriented programmes such as commerce. Students from families who did not have a tradition of university attendance, or who were academically unprepared for more rigorous professional programmes might choose community college, or direct entry to the work force from high school. However, high unemployment for youth from the mid-seventies onward has meant even poorer job prospects for those with less education.

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[17]See W. G. Picot, University Graduates and Jobs: Changes During the 1970s (Ottawa: Statistics Canada, March 1983).

Worldwide, the perception of an apparently unfavourable job market for university graduates has contributed to the wavering of public faith in higher education in the late 1970's, but other factors operate as well. Disruptions arising from student movements in the sixties and early seventies led to a decline in respect for universities among some sectors of the population. Geiger attributes part of a continuing ambivalence toward university education in France to the 1976 student revolt which was brought about by attempts to reform the curriculum and to limit the time allowed for obtaining a degree (Geiger, p. 20). In North America, similar public unease may have enabled governments to cut support for universities with more impunity than would have been the case if the high esteem of earlier years had been maintained. More recently, reductions in support, and accompanying publicity about a possible decline in quality may lead some prospective students to choose other alternatives. Limitations on access to particular programmes may be of even greater significance, however. It is not likely that capacity in high demand job-related programmes will expand beyond present levels. This constraint in supply could act to restrict total demand, unless student choice patterns shift unexpectedly.

II. FUTURE ENROLMENT IN ONTARIO

A. Factors Affecting Future Enrolment

In examining the possible future evolution of enrolment patterns in Ontario, the Committee on Enrolment Statistics and Projections notes that the labour market for university graduates (and for young workers, generally) and the ability of the universities to respond to student demand for particular programmes will continue to influence participation rates in the manner indicated in the first part of this paper. These, together with demographic considerations, underpin the Committee's projections of university enrolment in Ontario which are described in B. below. During the next decade, however, implementation of the recommendations in the Renewal of Secondary Education (ROSE)[18] report will have a significantly perturbing effect on the natural evolution of enrolment patterns in Ontario. Each of these factors may work either to increase or decrease participation rates.

1. The Labour Market

As we have seen in the previous section, much of the change in the apparent rate of demand for university graduates can be attributed to the coincidence of their rising supply (as the impact of the post-war baby boom on universities crests) with the stabilization of public sector growth. More recently, the generally poor economic climate has contributed to the decline in demand, though the short term impact of

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[18] The Renewal of Secondary Education in Ontario: Response to the Report of the Secondary Education Review Project (Toronto: Ministry of Education/Ministry of Colleges and Universities, November 1982).

such economic recession has probably tended to increase participation since continuing high umemployment lowers the opportunity cost of enrolment. Students unable to find jobs do not have to forego income by continuing their education. It is unlikely that such increased participation could be sustained in the long term, however.

It is generally assumed that worldwide economic recovery will occur and CESP is not disposed to challenge that basic assumption. In the private sector, the demand for university graduates will undoubtedly depend on the timing and strength of the economic recovery. If, as many predict, unskilled and semi-skilled jobs in many industries will be permanently lost to new technology, there may be increased demand for university education of the kind that leads to supposedly more secure employment. Although predictions of demand for individual occupations are unreliable, it appears that those with more education will be better prepared to function in a rapidly changing job market. While flexibility and the capacity to re-train may be more useful than narrow occupational training, in the short term it is likely that demand in universities will be strongest for job-related education.

Whether economic recovery will stimulate a resumption of public sector growth, however, is uncertain. It is clear that present levels of government fiscal restraint have reduced some public service employment opportunities below generally acceptable levels. Thus some modest net growth in public sector employment might be possible during the rest of this decade. Of more significance to the question of demand for university graduates is the expected shift in the nature of public services

provided attributable to problems arising from an aging population.[19]

Even with a generally stable public service establishment, it is likely that these projected shifts in public priorities will generate increased demand for those kinds of highly qualified professionals universities have traditionally supplied. In the immediate future, however, reduction of government deficits may have a higher priority than increased spending for health, social or educational programmes. Alternatively, governments may elect to increase tangible capital investments, which will produce some employment growth, but of a different type than that produced by direct investments in human capital areas. Thus, it is possible that even with general economic recovery there will be no real improvement in public sector employment and no induced demand by government for university education.

Eventually, the expected reduction in the youth cohort will reduce the number of young people entering the job market each year.[20] This should result in higher salaries and more openings for graduates, which in turn would increase demand for university participation. On the other hand, there will also be less competition in the labour market for new entrants regardless of educational attainment. Improved job opportunities may attract potential students away from higher education. This effect may be counterbalanced by the growing population of univer-

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[19] D. K. Foot, Public Policy and Future Population in Ontario (Toronto: Ontario Economic Council, 1979).

[20] On this subject, see R. A. Easterlin, Birth and Fortune: The Impact of Numbers on Personal Welfare (New York: Basic Books, 1980).

sity graduates producing university-age children.

The state of the labour market will also determine trends in both immigration and inter-provincial migration, both of which influence participation rates. Immigrants tend to be in the age range having children at or near university age. In addition, participation of women in higher education and in the labour force will probably continue, though the female participation rate will likely stabilize as it approaches that of males.

2. Evolution of Higher Education Policy

Changing economic conditions point towards increased demand for university participation. In addition, however, as was noted by the Committee on the Future Role of Universities in Ontario, accessibility to university-level education in this province could be improved. Significant disparities in participation rates exist by region within Ontario as well as for Franco-Ontarians, native peoples, the handicapped, women and those who live a long distance from any university.

Whether potential demand, for whatever reasons, for university education will be translated into increased participation rates depends in part on government policy and the responses of universities to that policy. Continued underfunding obviously limits the capacity of universities to respond to student demand and some hold that accessibility may have to be reduced in order to maintain quality, as was pointed out in the

Fisher Report.[21] Since demand is highest for professional and job-related programmes, which already have enrolment limitations, general university participation rates may not increase. Even if universities are willing to increase enrolments in these areas, they are restricted because of shortages of qualified faculty, equipment and operating funds. For example, it is increasingly obvious that all university graduates, not just those in science and technology, will need some training in computer applications, but most institutions are already struggling to provide facilities for their engineering and science majors.

It might also be observed that rather than enabling universities to provide the appropriate education for a changing labour market, government may choose to fund alternative forms of training, such as community colleges. The establishment of accessible and effective apprenticeship programmes, or other expansion of the postsecondary non-university sector could draw students away from university. On the other hand, students who now do not go beyond high school might be most affected. The European experience suggests that the non-university option is not often chosen by those socio-economic strata that have traditionally sent most of their children to universities. However, since the most scope for expanded participation is among lower income groups, non-university options might be favoured.

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[21]See The Challenge of the '80s: Preliminary Report of the Committee on the Future Role of Universities in Ontario (Toronto: Ministry of Colleges and Universities, March 1981), pp. 20-32 for the impact of various funding scenarios on accessibiility.

3. Changes in the Secondary School System

As we have seen, university participation is largely dependent on the number of high school graduates with the required qualifications for admission. At present, approximately 80% of new university entrants come directly from Ontario Grade 13. The number of secondary school students who complete Grade 13 with a standing eligible for university admission (an average of 60% in six credits) is dependent on the numbers entering the academic stream at Grade 9 as well as on decisions made at the Grade 12-Grade 13 juncture. Any changes that lessen or increase the likelihood of students completing the minimum requirements for university entrance in a given year will ultimately influence university participation rates.

Proposed changes in the Ontario secondary education system will obviously affect university enrolments in the latter half of the decade, although there is still some uncertainty about actual implementation of the ROSE recommendations, making it very difficult to quantify its impact. One objective of the ROSE recommendations is the improvement of general-level courses for those students who do not go on to university. If the revised general courses do attract students away from advanced-level courses in Grades 9 and 10, there will be fewer students in the stream leading to completion of the Ontario Academic Courses. However, since many students now entering the academic stream in Grade 9 do not complete Grade 13, the proportion of all students eventually completing the requisite upper level academic courses may not change. Also, it will still be advantageous for students to keep their options open for as long as possible. Even if the new general-level courses are made more effective than their present equivalents, it would be diffi-

cult for students from the general programme to enter and successfully complete advanced-level courses in Grades 11 or 12.

The increasing probability of students completing the Ontario Academic Courses in less than five years will tend to increase annual university enrolments later in the decade. Currently 5 to 6% of students complete Grade 13 requirements in fewer than five years. The revised secondary diploma with the Ontario Academic Courses needed for university admission could be completed in four years as early as June 1986. The last year of the present Honours graduation diploma will be June 1989.

B. Future Enrolment in Ontario

Each of the factors described above related to labour market developments and the evolution of higher education policy may work to either increase or decrease participation rates. In weighing these competing factors, CESP has concluded that it would be unwise, at present, to assume any fundamental changes in university participation rates. Further, the precise direction and extent of these changes cannot be built into the participation rates themselves until we have a clearer idea of government policy regarding funding.

Assisted by the development of an age-sex specific enrolment model (described in the Appendix), the Committee has formulated a base projection which extends estimated 1983/84 participation rates into the future unchanged. Participation is measured by sex, single year of age and educational activity (i.e. undergraduate/graduate, full-time/part-time). The results of the Committee's considerations are displayed in Figures 1-3 dealing with full time undergraduate enrolment, total enrolment (headcount) and total enrolment on an FTE basis.

Figure 1

Summary of Full-time Undergraduate Enrolment

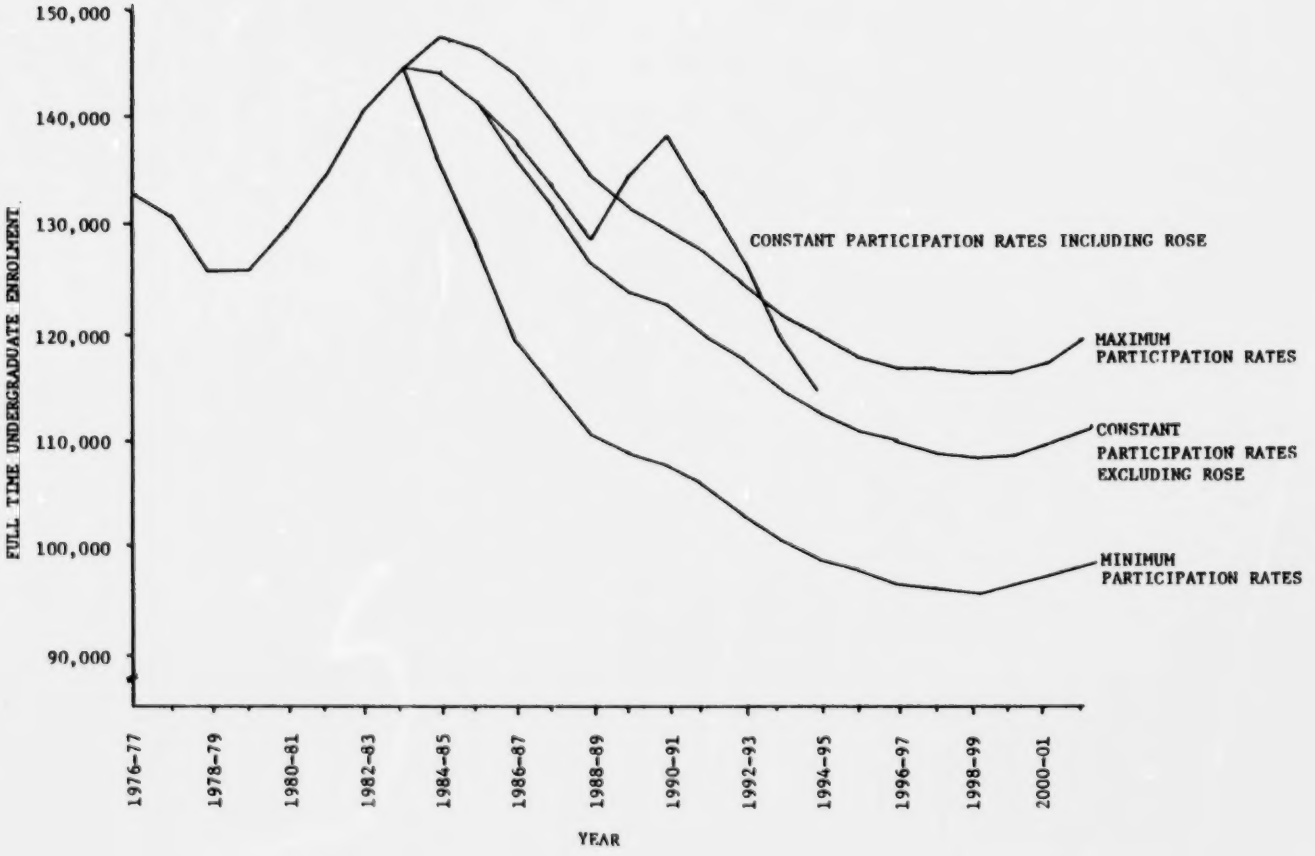


Figure 2

Summary of Enrolment Projections

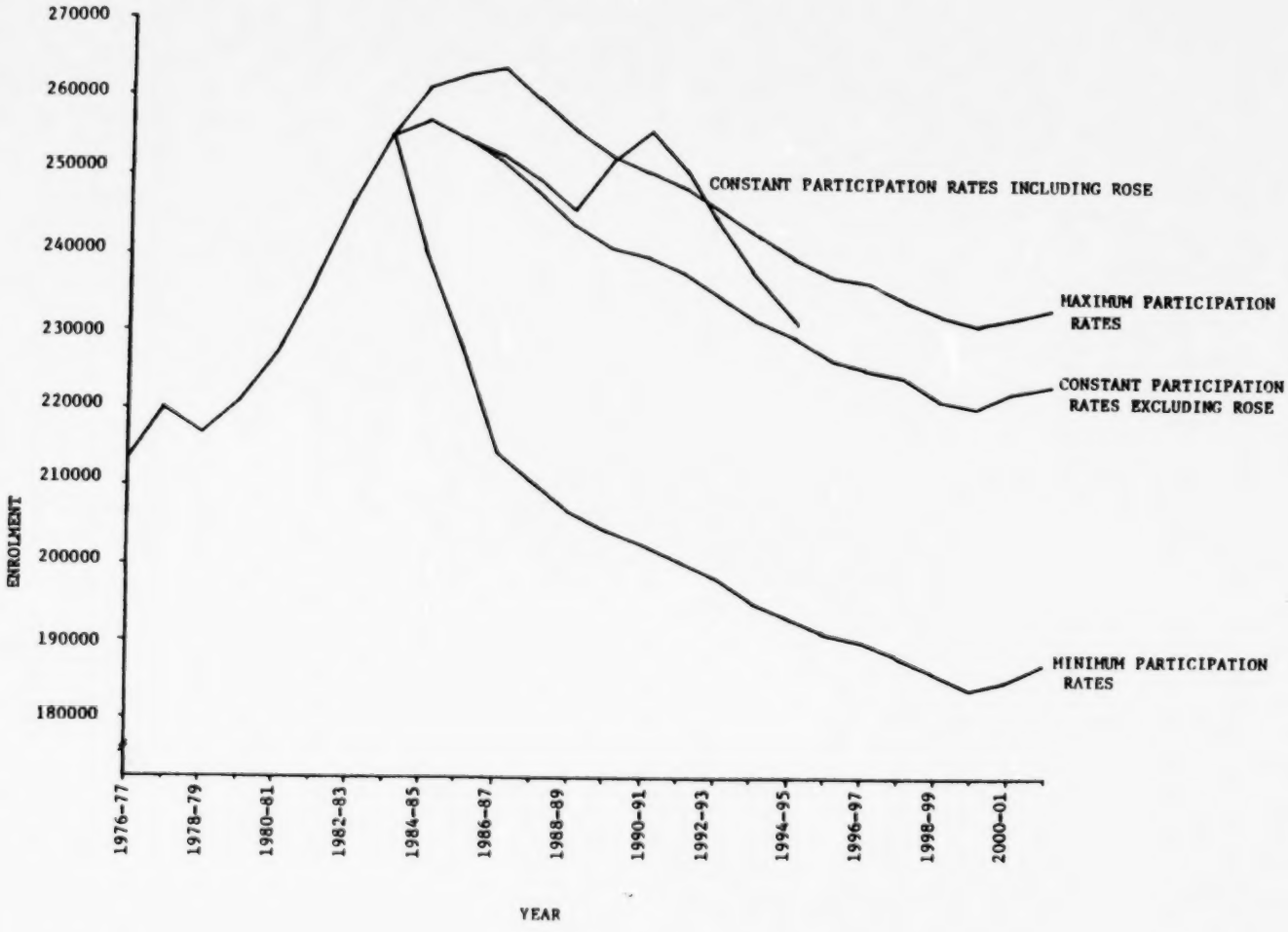
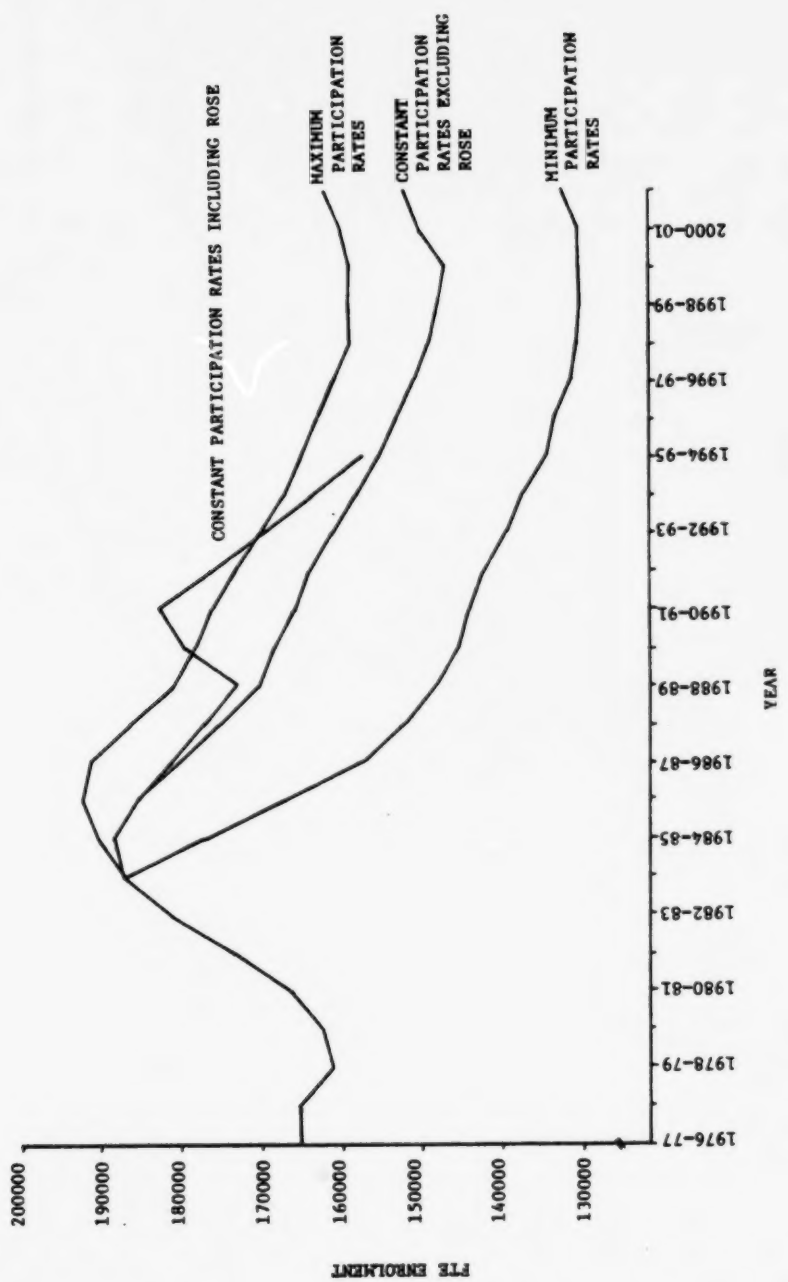


Figure 3

Summary of FTE Enrolment



The base projection should be regarded as a benchmark against which projections of historical minimum and maximum participation rates, and the effects of the ROSE recommendations can be measured. In this sense, it is not a forecast of what the Committee considers will happen. University (headcount) enrolment is seen peaking in 1984-85 and declining in relatively smooth fashion by 10% from present levels to a trough in 1999-2000. Because of a shift towards part-time students during the projection period and the conceptual correspondence between full-time equivalent students and required levels of university operating support, CESP has developed an age-specific sub-routine to facilitate conversion of headcounts to FTEs. On an FTE basis, the projected decline in university enrolment becomes 17%.

Rather than establishing arbitrary boundaries of confidence around its base projection, CESP has chosen to calculate minimum and maximum enrolment scenarios based on minimum and maximum participation rate values observed during recent years. The gap of 30,000 FTE students (46,000 headcount) evident between these two extremes at the end of our projection period shows the sensitivity of enrolment patterns to changes in participation rates even within the range of recent experience. The maximum scenario displays a 10.7% (5.1% headcount) decline from present enrolment levels; the minimum scenario, a 27.2% (23.7% headcount) decline. In examining the figures, it will be noted that recent evolution of participation rates causes the base projection to sit closer to the maximum than the minimum line. Clearly, the minumum and maximum lines shown in the figures represent arithmetic extremes. The Committee sees as more likely a less extreme range around the constant rate line.

In addition to the base projection, we have the particular problem of the ROSE recommendations. During the transitional period from about 1986 to 1989, universities could have higher numbers of applicants than would be the case under the existing Grade 13 system. By 1990-91, CESP has assumed that 80% of high school graduates eligible for university might complete their programme in four rather than five years. The transition from five to four years will cause university enrolments to remain relatively stable through 1991-92 at which point the projected but delayed decreases arising from demographic change will begin to take effect.

The implications of these future trends can be summarized briefly. Changes in the Ontario secondary educational system will directly affect participation rates from about 1986 through at least the end of this decade. The trend towards earlier completion of the secondary school academic programme will probably increase the numbers of applicants during a period when demographically-induced declines are expected.

Labour market trends also point to increased demand for education in general and for specialized technological and scientific education in particular. There will be a need for retraining of workers displaced by changes in the workplace, and for education to help people adjust to these changes. At the same time, improvements in the level of education of the general population should ultimately lead to more demand for advanced education. In other words, pure demand will probably increase. Whether university participation rates increase depends on the available supply of appropriate places, which are in turn determined by government policies regarding financing, and by institutional capacity to adapt.

Appendix

CESP Enrolment Projection Model

In considering alternative methodologies available to it for examining the possible evolution of enrolment patterns in Ontario, the Committee on Enrolment Statistics and Projections was conscious of the significance of demographic change projected for the next fifteen years. It has opted, therefore, for the development of an enrolment projection model which it believes to be particularly sensitive to such change. Specifically, it has adopted a strategy developed by MOSST in which projections are based on sex and single years of age.

I. OPERATION OF THE MODEL

The basic theory inherent in the MOSST enrolment model is that university enrolment can be broken down into various subcategories each of which might be projected to behave differently. These subcategories in the MOSST model are determined by sex and enrolment stream. It is assumed, then, that behaviour will vary between male and female, between undergraduate and graduate and between full-time and part-time. Conversely, MOSST also assumed that individuals within a particular subcategory will exhibit similar behavioural patterns. The following enrolment categories are defined in the model:

- full-time undergraduate, male
- full-time undergraduate, female
- part-time undergraduate, male
- part-time undergraduate, female
- full-time graduate, male
- full-time graduate, female
- part-time graduate, male
- part-time graduate, female

The second methodological feature of the MOSST model is that it utilizes single years of age. In projecting enrolment, separate projections are made for each of the eight enrolment categories. These projections are the product of the number of males (or females) in the population in a given year (by single year of age) for the entire age range supplying university students and the age-sex specific participation rates by single year of age for each of the enrolment categories.

At this point the CESP model deviates from the MOSST model. In the MOSST model the age-sex specific participation rates are derived for a base year (i.e. the final year for which actual data are available) and remain in constant relationship over the projection period. Variations in the participation rates for future years are effected by multiplying the products of enrolment and participation rates, summed over the entire age range for an enrolment category, by a general participation index for that enrolment category. The implicit assumption in the use of this index is that any changes in the participation rates would be uniform over the entire age range within a particular enrolment category.

For the CESP model, it was thought that different age groups within an enrolment category might exhibit differing behavioural patterns. That being the case, it would be inappropriate to use the participation index approach. Instead, the participation rates are allowed to vary over the projection period. This is accomplished by multiplying the value of the participation rate for the previous year by a rate of change factor. Projected values for this factor may be derived from mathematical formulae or estimated by judgement and experience. To keep the number of rate of change factors at a reasonable level, only five age ranges

are permitted within each enrolment category. The projection formula used in the Ontario model is as follows:

$$E_t = \sum_i \sum_j c_{ikt} \quad r_{ijt-1} \quad P_{jt}$$

where: E_t is the enrolment at time t

c_{ikt} is the rate of change factor for the participation rate of the i th enrolment category for the k th age range at time t

r_{ijt-1} is the participation rate of the i th enrolment category for the j th age group at time t-1

P_{jt} is the population of the j th age group at time t

Note: As j varies from 1 to 29, k varies from 1 to 5.

It should be noted that visa student enrolment is not included in the model just described. The substantial growth in foreign student enrolment in recent years would have seriously biased the calculations of the domestic participation rates and have been excluded for this reason. Estimates of future levels of visa student enrolment are handled in a subprogram of the model. These estimates may be obtained through informed judgement or through a separate mathematical routine.

Given that the CESP model utilizes single year of age, it was deemed appropriate that an attempt should be made to base the conversion of part-time enrolment into FTE enrolment on single year of age as well. Data were obtained from Statistics Canada for 1981-82 showing the distribution of FTE enrolment by single year of age. A ratio of FTE enrolment per headcount was then calculated for each age. Part-time enrolment generated by the model on a headcount basis were then converted into FTE enrolment by multiplying the headcount figure by the appropriate ratio. (This methodology was only used in the model to convert part-time undergraduate enrolment. As no particular pattern was

evident at the graduate level, it was deemed inappropriate to use this approach. Part-time graduate enrolment was converted into FTE enrolment by multiplying the figure for each age by 0.35. This figure is the FTE conversion factor used by Statistics Canada in its reports).

II. DATA REQUIREMENTS OF THE MODEL

The model requires two series of data, enrolment data and population data. Historical enrolment data were obtained from the Statistics Canada USIS files. A special request was submitted to Statistics Canada; data for the Ontario universities were obtained broken out by enrolment category, sex and single year of age. Visa status students were reported separately by enrolment category only. All of the enrolment data were based on Fall term counts.

Population data, both historical and projected, were obtained from the Projections Section of Statistics Canada. The historical figures are population estimates to 1980. The projected population figures for Ontario are unofficial revised projections derived from projections by Zoltan Zsigmond.[1] (In deriving these population projections, the following assumptions were made for fertility rates and migration patterns. The fertility rate, which represents the average number of children expected to be born to a woman throughout her life, was

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[1] W. Clark, M.S. Devereaux and Z. Zsigmond, The Class of 2001 (Ottawa: Statistics Canada, 1979).

assumed to decrease from a value of 1.8 in 1976 to a value of 1.6 by 1991, and then to remain constant for the remainder of the simulation period. Net migration for Ontario was assumed to be around zero in the first half of the eighties, rising to about +10,000 by the end of the a decade and then remaining constant for the remainder of the projection period.)

For university enrolment, the age group used was 17-60 (with the "under 18" group assumed to be 17 and over 40 groups combined into 5 year spans).

III. ENROLMENT PROJECTION ASSUMPTIONS

When running the CESP enrolment model two factors may influence future enrolment levels, projected population figures and projected participation rate figures. In the present series of enrolment projections, the projected population figures used are the same in all cases. This leaves participation rate as the only variable which is altered in the model.

It has been noted that future values of the participation rates within an enrolment category are calculated by multiplying the previous year's participation rates (within a particular age range) by the rate of change factor (for that age range and enrolment category). However, before this methodology is used the model is constrained to generate predetermined enrolments in the two years following the base year. The "base year" in the model is defined to be the final year for which actual detailed data are available from Statistics Canada. For the current series of projections the base year is 1981-82. However, preliminary enrolment data are available for 1982-83 and CESP has pro-

jected enrolment levels for 1983-84 for the COU Committee on Operating Grants. The enrolment model was run with individual participation rates being adjusted to produce enrolment levels that were equal to the 1982-83 and 1983-84 values noted above. The model was then run to generate three enrolment scenarios.

A. Base projection

For this projection average participation rates for each age range within enrolment categories were plotted for 1976-77 through 1983-84. Rate of change factors were derived for 1984-85 based on an examination of these plots, with greater emphasis given to the more recent years of data. The 1984-85 rate of change factors were designed to force the average participation rates into a stable situation. For the remainder of the simulation period the rate of change factors were held at unity, i.e., participation rates were held constant at their 1984-85 values. Rather than establishing an arbitrary range of confidence around its base projection, CESP concluded that it would be more useful to formulate enrolment scenarios based on observed minimum and maximum participation rates.

B. Minimum rates scenario

Average participation rates for each age group within each enrolment category for the period 1976-1984 were examined and the minimum values were selected. The rate of change factors were then derived for each age group for 1984-85, 1985-86 and 1986-87 so that by 1986-87 the average participation rate for each age group would again be at its minimum value as determined above. For the remainder of the simulation period participation rates were held constant at their 1986-87 values. (For those age groups in which the minimum value of the average partici-

pation rate was reached in 1983-84, the above approach was not followed. In these cases participation rates were held constant at their 1983-84 values.)

C. Maximum rates scenario

This projection follows the approach utilized in the minimum rates projection with the exception that the maximum values of the average participation rates experienced during the period 1976-84 were selected.

For each scenario three reports are generated by the model. The first report presents a summary of historical and projected enrolment for undergraduate and graduate (both full-time and part-time) and the total for each year. For each category both the number of students and the percent change from the previous year are presented. The second report is similar to the first but presents FTE enrolment for part-time undergraduate and graduate instead of headcounts. The third report is a series of tables showing participation rates from 1976-77 through 1991-92 for each of the eight enrolment categories. Within each category the participation rates are presented for each single year of age. In addition the average participation rate for each age range within the enrolment category is shown together with the average participation rate for the enrolment category. Reports 1 and 2 above are included at the end of this appendix. The third report showing detailed participation rates is available upon request.

IV. SIMULATION OF THE ROSE CHANGES

Simulating the effects of the secondary school curriculum changes presented many problems. The CESP enrolment model utilizes age ranges but clearly the changes due to ROSE would impact on specific years of age.

Before detailing the modifications to the model that were required, a brief examination of the background analyses is presented.

While the changes in the secondary school curriculum were announced formally in late November 1982, very little has been forthcoming as to how these changes will actually be implemented. In particular, no figures were available showing the numbers of secondary school graduates in future years and the gradual shift away from the present situation, where the majority of these graduates complete their secondary schooling in five years. At present about 5% of the 30,000 secondary school graduates who enter Ontario universities have completed secondary school in fewer than five years. For this simulation it has been assumed that the number who graduate in fewer than five years will begin to accelerate, commencing with those graduates who will enter university in 1986-87. In each subsequent year the number of university entrants from the 4-year secondary school stream will increase. Finally, by 1990-91 it has been assumed that a stable pattern will again exist, with fully 80% of the university entrants from secondary school being derived from the 4-year stream. The remaining 20% will have completed secondary school in the traditional five years.

Using these assumptions, the flow of students through the secondary school system was estimated. Commencing in 1986-87, the number of secondary school entrants to university is expected to begin increasing, reaching a peak around 1989-90 or 1990-91. Under the preceding assumptions, by 1991-92 a stable pattern of entrants will again exist, with the number of entrants returning to the 1985-86 level. (As this exercise was carried out to determine the rate of change in the number

of university entrants from secondary schools, it was assumed that the number of potential university entrants entering grade 9 was constant for the years in question.) The changes in the distribution of university entrants from secondary school are shown in Figure 1.

Obtaining the changes in the numbers of entrants was simply the first step in the process. It was then necessary to distribute these additional entrants by sex and age. It was first assumed that the additional entrants would be equally divided between male and female. The distribution by sex and age of university entrants from secondary school was examined for 1981-82 (the latest year for which data were available). It was then assumed that university entrants in 1985-86 (the last year before the effects of the ROSE changes would be felt) would have this same distribution. Over the next few years there would be a gradual shift in age as graduates tended to leave secondary school at a younger age as more and more secondary school students opted for the 4-year programme. Assumptions were made about the rate at which this shift would occur and about the stable age distribution that would result at the end of this transition period. It was also necessary to assume that secondary school graduates over the age of 21 would not be affected by the change in curriculum.

Using the age distribution patterns derived above, it was then possible to calculate the number of university entrants from secondary school for the period 1985-86 through 1991-92 by sex and age. As 1985-86 represented the final year under the old curriculum, it was then possible to derive the changes in the number of entrants in subsequent years by age and sex from this base year. The final step in the exercise was to determine the effects of these changes in university entrants on

Figure 1

Changes in the Percentage Distribution of University Entrants (From Secondary School) Due to ROSE

	Grade 9		Grade 10		Grade 11		Grade 12		Grade 13	University
	4 yr.	5 yr.	4 yr.	5 yr.	4 yr.	5 yr.	4 yr.	5 yr.	5 yr.	Entrants
1981-82	5.0	95.0								
1982-83	5.0	95.0	5.0	95.0						
1983-84	10.0	90.0	6.7	93.3	5.0	95.0				
1984-85	20.0	80.0	11.0	89.0	8.3	91.7	5.0	95.0	95.0	
1985-86	50.0	50.0	20.0	80.0	12.0	88.0	8.3	91.7	95.0	100.0
1986-87	80.0	20.0	50.0	50.0	20.0	80.0	13.3	86.7	91.7	103.3
1987-88	80.0	20.0	80.0	20.0	50.0	50.0	20.0	80.0	86.7	105.0
1988-89			80.0	20.0	80.0	20.0	50.0	50.0	80.0	106.7
1989-90					80.0	20.0	80.0	20.0	50.0	130.0
1990-91							80.0	20.0	20.0	130.0
1991-92										100.0

NOTE: For any given year, university entrants were obtained by summing Grade 12 students from the 4-year stream and Grade 13 students (for the previous year in both cases).

university enrolments in higher years.

Again, certain limitations had to be imposed on these final calculations. While the effects of changes in year 1 would be felt at the graduate level, it was decided that changes would be derived for only the undergraduate level. It was also assumed that students over the age of 24 would not be affected. Using an assumed set of transition rates between undergraduate years of study, the changes in university enrolment by sex and single year of age were derived. (A stable pattern did not occur until 1994-95). These changes were then applied to enrolment figures by sex and single year of age determined by the base projection from the CESP model to calculate adjustment factors. The model was then run to simulate the effects of the secondary school curriculum changes.

TABLE 1-1

SUMMARY OF ENROLMENT PROJECTIONS USING CONSTANT PARTICIPATION RATES
(EXCLUDING VISA STUDENTS AND CHANGES DUE TO ROSE)

		UNDERGRADUATE				GRADUATE				TOTAL	
		FULL-TIME		PART-TIME		FULL-TIME		PART-TIME			
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
HISTORICAL	1976-77	132,646	0.0	58,373	0.0	12,227	0.0	11,189	0.0	214,435	0.0
	1977-78	130,537	-1.6	65,131	11.6	12,591	3.0	11,630	3.9	219,889	2.5
	1978-79	126,178	-3.3	66,789	2.5	12,400	-1.5	11,383	-2.1	216,750	-1.4
	1979-80	126,398	0.2	70,859	6.1	12,102	-2.4	11,419	0.3	220,778	1.9
	1980-81	129,642	2.6	73,827	4.2	12,214	0.9	11,480	0.5	227,163	2.9
	1981-82	134,629	3.8	77,525	5.0	12,738	4.3	11,354	-1.1	236,246	4.0
PROJECTED	1982-83	141,200	4.9	81,304	4.9	13,460	5.7	11,475	1.1	247,439	4.7
	1983-84	145,327	2.9	84,141	3.5	13,832	2.8	11,618	1.2	254,917	3.0
	1984-85	145,338	0.0	85,912	2.1	14,132	2.2	11,815	1.7	257,196	0.9
	1985-86	141,832	-2.4	87,075	1.4	14,319	1.3	12,043	1.9	255,268	-0.7
	1986-87	137,120	-3.3	88,137	1.2	14,471	1.1	12,287	2.0	252,015	-1.3
	1987-88	131,597	-4.0	88,935	0.9	14,566	0.7	12,498	1.7	247,596	-1.8
	1988-89	126,907	-3.6	89,420	0.5	14,565	-0.0	12,682	1.5	243,575	-1.6
	1989-90	124,177	-2.2	89,711	0.3	14,450	-0.8	12,829	1.2	241,166	-1.0
	1990-91	122,559	-1.3	89,936	0.3	14,247	-1.4	12,943	0.9	239,685	-0.6
	1991-92	120,444	-1.7	90,119	0.2	13,995	-1.8	13,009	0.5	237,567	-0.9
	1992-93	118,025	-2.0	90,294	0.2	13,776	-1.6	13,031	0.2	235,125	-1.0
	1993-94	115,236	-2.4	90,221	-0.1	13,598	-1.3	13,000	-0.2	232,054	-1.3
	1994-95	113,104	-1.8	90,008	-0.2	13,428	-1.2	12,961	-0.3	229,501	-1.1
	1995-96	111,424	-1.5	89,676	-0.4	13,210	-1.6	12,900	-0.5	227,209	-1.0
	1996-97	110,748	-0.6	89,311	-0.4	12,962	-1.9	12,822	-0.6	225,843	-0.6
	1997-98	110,347	-0.4	88,863	-0.5	12,727	-1.8	12,711	-0.9	224,648	-0.5
	1998-99	110,154	-0.2	88,271	-0.7	12,538	-1.5	12,565	-1.2	223,528	-0.5
	1999-00	110,373	0.2	87,826	-0.5	12,391	-1.2	12,453	-0.9	223,041	-0.2
	2000-01	111,645	1.2	87,324	-0.6	12,264	-1.0	12,318	-1.1	223,551	0.2
	2001-02	113,066	1.3	86,819	-0.6	12,148	-0.9	12,170	-1.2	224,204	0.3

TABLE 1-2

SUMMARY OF FTE ENROLMENT PROJECTIONS USING CONSTANT PARTICIPATION RATES
(EXCLUDING VISA STUDENTS AND CHANGES DUE TO ROSE)

		UNDERGRADUATE				GRADUATE				TOTAL	
		FULL-TIME		PART-TIME		FULL-TIME		PART-TIME			
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
HISTORICAL	1976-77	132,646.0	0.0	16,287.3	0.0	12,227.0	0.0	3,729.7	0.0	164,890.0	0.0
	1977-78	130,537.0	-1.6	18,313.7	12.4	12,591.0	3.0	3,876.7	3.9	165,318.0	0.3
	1978-79	126,178.0	-3.3	18,792.6	2.6	12,400.0	-1.5	3,794.3	-2.1	161,165.0	-2.5
	1979-80	126,398.0	0.2	19,925.0	6.0	12,102.0	-2.4	3,806.3	0.3	162,231.0	0.7
	1980-81	129,642.0	2.6	20,655.8	3.7	12,214.0	0.9	3,826.7	0.5	166,339.0	2.5
	1981-82	134,629.0	3.8	21,729.1	5.2	12,738.0	4.3	3,784.7	-1.1	172,881.0	3.9
PROJECTED	1982-83	141,200.0	4.9	22,890.3	5.3	13,460.1	5.7	3,825.1	1.1	181,376.0	4.9
	1983-84	145,327.0	2.9	23,655.8	3.3	13,831.8	2.8	3,872.8	1.2	186,687.0	2.9
	1984-85	145,338.0	0.0	24,107.7	1.9	14,131.9	2.2	3,938.2	1.7	187,516.0	0.4
	1985-86	141,832.0	-2.4	24,372.7	1.1	14,318.6	1.3	4,014.3	1.9	184,538.0	-1.6
	1986-87	137,120.0	-3.3	24,598.6	0.9	14,471.4	1.1	4,095.6	2.0	180,286.0	-2.3
	1987-88	131,597.0	-4.0	24,732.0	0.5	14,565.7	0.7	4,165.9	1.7	175,061.0	-2.9
	1988-89	126,907.0	-3.6	24,769.7	0.2	14,565.1	-0.0	4,227.5	1.5	170,469.0	-2.6
	1989-90	124,177.0	-2.2	24,760.4	-0.0	14,449.8	-0.8	4,276.4	1.2	167,664.0	-1.6
	1990-91	122,559.0	-1.3	24,751.3	-0.0	14,246.9	-1.4	4,314.3	0.9	165,872.0	-1.1
	1991-92	120,444.0	-1.7	24,753.2	0.0	13,995.0	-1.8	4,336.2	0.5	163,528.0	-1.4
	1992-93	118,025.0	-2.0	24,771.4	0.1	13,775.7	-1.6	4,343.8	0.2	160,916.0	-1.6
	1993-94	115,236.0	-2.4	24,722.4	-0.2	13,597.6	-1.3	4,333.4	-0.2	157,889.0	-1.9
	1994-95	113,104.0	-1.9	24,624.1	-0.4	13,428.1	-1.2	4,320.4	-0.3	155,477.0	-1.5
	1995-96	111,424.0	-1.5	24,495.0	-0.5	13,209.5	-1.6	4,300.1	-0.5	153,429.0	-1.3
	1996-97	110,748.0	-0.6	24,372.7	-0.5	12,961.8	-1.9	4,274.0	-0.6	152,357.0	-0.7
	1997-98	110,347.0	-0.4	24,244.4	-0.5	12,727.2	-1.8	4,237.1	-0.9	151,556.0	-0.5
	1998-99	110,154.0	-0.2	24,087.6	-0.6	12,538.2	-1.5	4,188.3	-1.2	150,968.0	-0.4
	1999-00	110,373.0	0.2	23,972.4	-0.5	12,390.5	-1.2	4,150.8	-0.9	150,887.0	-0.1
	2000-01	111,645.0	1.2	23,850.9	-0.5	12,264.2	-1.0	4,106.0	-1.1	151,866.0	0.6
	2001-02	113,066.0	1.3	23,731.5	-0.5	12,148.0	-0.9	4,056.7	-1.2	153,002.0	0.7

TABLE 2-1

SUMMARY OF ENROLMENT PROJECTIONS USING MINIMUM PARTICIPATION RATES
(EXCLUDING VISA STUDENTS AND CHANGES DUE TO ROSE)

		UNDERGRADUATE				GRADUATE				TOTAL	
		FULL-TIME		PART-TIME		FULL-TIME		PART-TIME			
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
HISTORICAL	1976-77	132,646	0.0	58,373	0.0	12,227	0.0	11,189	0.0	214,435	0.0
	1977-78	130,537	-1.6	65,131	11.6	12,591	3.0	11,630	3.9	219,889	2.5
	1978-79	126,178	-3.3	66,789	2.5	12,400	-1.5	11,382	-2.1	216,750	-1.4
	1979-80	126,398	0.2	70,859	6.1	12,102	-2.4	11,419	0.3	220,778	1.9
	1980-81	129,642	2.6	73,827	4.2	12,214	0.9	11,480	0.5	227,163	2.9
	1981-82	134,629	3.8	77,525	5.0	12,738	4.3	11,354	-1.1	236,246	4.0
PROJECTED	1982-83	141,200	4.9	81,304	4.9	13,460	5.7	11,475	1.1	247,439	4.7
	1983-84	145,327	2.9	84,141	3.5	13,832	2.8	11,618	1.2	254,917	3.0
	1984-85	137,429	-5.4	78,775	-6.4	13,407	-3.1	11,485	-1.1	241,096	-5.4
	1985-86	129,017	-6.1	74,245	-5.8	13,021	-2.9	11,422	-0.5	227,704	-5.6
	1986-87	120,432	-6.7	70,432	-5.1	12,685	-2.6	11,409	-0.1	214,958	-5.6
	1987-88	115,537	-4.1	71,034	0.9	12,760	0.6	11,605	1.7	210,936	-1.9
	1988-89	111,399	-3.6	71,296	0.4	12,744	-0.1	11,773	1.4	207,211	-1.8
	1989-90	108,974	-2.2	71,418	0.2	12,620	-1.0	11,907	1.1	204,918	-1.1
	1990-91	107,500	-1.4	71,498	0.1	12,417	-1.6	12,010	0.9	203,425	-0.7
	1991-92	105,631	-1.7	71,552	0.1	12,170	-2.0	12,068	0.5	201,421	-1.0
	1992-93	103,495	-2.0	71,604	0.1	11,954	-1.8	12,085	0.1	199,137	-1.1
	1993-94	101,035	-2.4	71,473	-0.2	11,781	-1.4	12,053	-0.3	196,342	-1.4
	1994-95	99,138	-1.9	71,214	-0.4	11,623	-1.3	12,013	-0.3	193,988	-1.2
	1995-96	97,671	-1.5	70,841	-0.5	11,422	-1.7	11,951	-0.5	191,885	-1.1
	1996-97	97,081	-0.6	70,417	-0.6	11,197	-2.0	11,872	-0.7	190,566	-0.7
	1997-98	96,746	-0.3	69,931	-0.7	10,985	-1.9	11,763	-0.9	189,424	-0.6
	1998-99	96,587	-0.2	69,363	-0.8	10,812	-1.6	11,619	-1.2	188,382	-0.6
	1999-00	96,815	0.2	68,889	-0.7	10,677	-1.3	11,510	-0.9	187,891	-0.3
	2000-01	97,946	1.2	68,378	-0.7	10,565	-1.0	11,379	-1.1	188,268	0.2
	2001-02	99,216	1.3	67,862	-0.8	10,465	-0.9	11,235	-1.3	188,778	0.3

SUMMARY OF FTE ENROLMENT PROJECTIONS USING MINIMUM PARTICIPATION RATES
(EXCLUDING VISA STUDENTS AND CHANGES DUE TO ROSE)

		UNDERGRADUATE				GRADUATE				TOTAL	
		FULL-TIME		PART-TIME		FULL-TIME		PART-TIME			
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
HISTORICAL	1976-77	132,646.0	0.0	16,287.3	0.0	12,227.0	0.0	3,729.7	0.0	164,890.0	0.0
	1977-78	130,537.0	-1.6	18,313.7	12.4	12,591.0	3.0	3,876.7	3.9	165,318.0	0.3
	1978-79	126,178.0	-3.3	18,792.6	2.6	12,400.0	-1.5	3,794.3	-2.1	161,165.0	-2.5
	1979-80	126,398.0	0.2	19,925.0	6.0	12,102.0	-2.4	3,806.3	0.3	162,231.0	0.7
	1980-81	129,642.0	2.6	20,655.8	3.7	12,214.0	0.9	3,826.7	0.5	166,339.0	2.5
	1981-82	134,629.0	3.8	21,729.1	5.2	12,738.0	4.3	3,784.7	-1.1	172,881.0	3.9
PROJECTED	1982-83	141,200.0	4.9	22,890.3	5.3	13,460.1	5.7	3,825.1	1.1	181,376.0	4.9
	1983-84	145,327.0	2.9	23,655.8	3.3	13,831.8	2.8	3,872.8	1.2	186,687.0	2.9
	1984-85	137,429.0	-5.4	22,144.3	-6.4	13,406.6	-3.1	3,828.4	-1.1	176,808.0	-5.3
	1985-86	129,017.0	-6.1	20,846.0	-5.9	13,020.5	-2.9	3,807.4	-0.5	166,691.0	-5.7
	1986-87	120,432.0	-6.7	19,739.3	-5.3	12,685.1	-2.6	3,802.9	-0.1	156,659.0	-6.0
	1987-88	115,537.0	-4.1	19,835.1	0.5	12,759.6	0.6	3,868.4	1.7	152,000.0	-3.0
	1988-89	111,399.0	-3.6	19,830.8	-0.0	12,743.8	-0.1	3,924.3	1.4	147,898.0	-2.7
	1989-90	108,974.0	-2.2	19,792.2	-0.2	12,619.6	-1.0	3,968.9	1.1	145,355.0	-1.7
	1990-91	107,500.0	-1.4	19,756.5	-0.2	12,417.2	-1.6	4,003.2	0.9	143,677.0	-1.2
	1991-92	105,631.0	-1.7	19,733.3	-0.1	12,170.2	-2.0	4,022.6	0.5	141,557.0	-1.5
	1992-93	103,495.0	-2.0	19,725.5	-0.0	11,953.5	-1.8	4,028.4	0.1	139,202.0	-1.7
	1993-94	101,035.0	-2.4	19,667.2	-0.3	11,781.4	-1.4	4,017.6	-0.3	136,501.0	-1.9
	1994-95	99,138.3	-1.9	19,564.7	-0.5	11,622.7	-1.3	4,004.2	-0.3	134,330.0	-1.6
	1995-96	97,670.8	-1.5	19,432.3	-0.7	11,422.2	-1.7	3,983.6	-0.5	132,509.0	-1.4
	1996-97	97,080.5	-0.6	19,299.9	-0.7	11,197.1	-2.0	3,957.2	-0.7	131,535.0	-0.7
	1997-98	96,745.6	-0.3	19,164.6	-0.7	10,984.7	-1.9	3,920.9	-0.9	130,816.0	-0.5
	1998-99	96,586.9	-0.2	19,015.0	-0.8	10,812.4	-1.6	3,873.1	-1.2	130,287.0	-0.4
	1999-00	96,815.2	0.2	18,892.9	-0.6	10,676.5	-1.3	3,836.8	-0.9	130,221.0	-0.1
	2000-01	97,945.7	1.2	18,768.2	-0.7	10,565.0	-1.0	3,792.9	-1.1	131,072.0	0.7
	2001-02	99,216.2	1.3	18,644.1	-0.7	10,465.0	-0.9	3,744.9	-1.3	132,070.0	0.8

TABLE 3-1

SUMMARY OF ENROLMENT PROJECTIONS USING MAXIMUM PARTICIPATION RATES
(EXCLUDING VISA STUDENTS AND CHANGES DUE TO ROSE)

		UNDERGRADUATE				GRADUATE				TOTAL	
		FULL-TIME		PART-TIME		FULL-TIME		PART-TIME			
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
HISTORICAL	1976-77	132,646	0.0	58,373	0.0	12,227	0.0	11,189	0.0	214,435	0.0
	1977-78	130,537	-1.6	65,131	11.6	12,591	3.0	11,630	3.9	219,889	2.5
	1978-79	126,178	-3.3	66,789	2.5	12,400	-1.5	11,383	-2.1	216,750	-1.4
	1979-80	126,398	0.2	70,859	6.1	12,102	-2.4	11,419	0.3	220,778	1.9
	1980-81	129,642	2.6	73,827	4.2	12,214	0.9	11,480	0.5	227,163	2.9
	1981-82	134,629	3.8	77,525	5.0	12,738	4.3	11,354	-1.1	236,246	4.0
PROJECTED	1982-83	141,200	4.9	81,304	4.9	13,460	5.7	11,475	1.1	247,439	4.7
	1983-84	145,327	2.9	84,141	3.5	13,832	2.8	11,618	1.2	254,917	3.0
	1984-85	147,789	1.7	85,971	2.2	14,685	6.2	12,609	8.5	261,055	2.4
	1985-86	147,244	-0.4	87,182	1.4	15,442	5.2	13,656	8.3	263,524	0.9
	1986-87	145,240	-1.4	88,281	1.3	16,160	4.6	14,756	8.1	264,437	0.3
	1987-88	139,547	-3.9	89,072	0.9	16,256	0.6	15,010	1.7	259,884	-1.7
	1988-89	134,780	-3.4	89,551	0.5	16,244	-0.1	15,228	1.5	255,803	-1.6
	1989-90	131,886	-2.1	89,842	0.3	16,099	-0.9	15,403	1.1	253,230	-1.0
	1990-91	129,962	-1.5	90,070	0.3	15,857	-1.5	15,537	0.9	251,426	-0.7
	1991-92	127,607	-1.8	90,250	0.2	15,560	-1.9	15,615	0.5	249,032	-1.0
	1992-93	124,997	-2.0	90,418	0.2	15,294	-1.7	15,640	0.2	246,349	-1.1
	1993-94	122,155	-2.3	90,341	-0.1	15,076	-1.4	15,601	-0.3	243,173	-1.3
	1994-95	119,920	-1.8	90,127	-0.2	14,871	-1.4	15,550	-0.3	240,468	-1.1
	1995-96	118,187	-1.4	89,796	-0.4	14,615	-1.7	15,472	-0.5	238,070	-1.0
	1996-97	117,431	-0.6	89,431	-0.4	14,332	-1.9	15,371	-0.6	236,566	-0.6
	1997-98	116,982	-0.4	88,984	-0.5	14,065	-1.9	15,233	-0.9	235,264	-0.6
	1998-99	116,793	-0.2	88,392	-0.7	13,855	-1.5	15,050	-1.2	234,091	-0.5
	1999-00	117,112	0.3	87,948	-0.5	13,693	-1.2	14,909	-0.9	233,661	-0.2
	2000-01	118,433	1.1	87,448	-0.6	13,555	-1.0	14,738	-1.1	234,173	0.2
	2001-02	119,908	1.2	86,948	-0.6	13,427	-0.9	14,552	-1.3	234,835	0.3

TABLE 3-2

SUMMARY OF FTE ENROLMENT PROJECTIONS USING MAXIMUM PARTICIPATION RATES
(EXCLUDING VISA STUDENTS AND CHANGES DUE TO ROSE)

		UNDERGRADUATE				GRADUATE				TOTAL	
		FULL-TIME		PART-TIME		FULL-TIME		PART-TIME			
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
HISTORICAL	1976-77	132,646.0	0.0	16,287.3	0.0	12,227.0	0.0	3,729.7	0.0	164,890.0	0.0
	1977-78	130,537.0	-1.6	18,313.7	12.4	12,591.0	3.0	3,876.7	3.9	165,318.0	0.3
	1978-79	126,178.0	-3.3	18,792.6	2.6	12,400.0	-1.5	3,794.3	-2.1	161,165.0	-2.5
	1979-80	126,398.0	0.2	19,925.0	6.0	12,102.0	-2.4	3,806.3	0.3	162,231.0	0.7
	1980-81	129,642.0	2.6	20,655.8	3.7	12,214.0	0.9	3,826.7	0.5	166,339.0	2.5
	1981-82	134,629.0	3.8	21,729.1	5.2	12,738.0	4.3	3,784.7	-1.1	172,881.0	3.9
PROJECTED	1982-83	141,200.0	4.9	22,890.3	5.3	13,460.1	5.7	3,825.1	1.1	181,376.0	4.9
	1983-84	145,327.0	2.9	23,655.8	3.3	13,831.8	2.8	3,872.8	1.2	186,687.0	2.9
	1984-85	147,789.0	1.7	24,131.5	2.0	14,685.0	6.2	4,203.0	8.5	190,808.0	2.2
	1985-86	147,244.0	-0.4	24,415.5	1.2	15,442.2	5.2	4,551.9	8.3	191,654.0	0.4
	1986-87	145,240.0	-1.4	24,656.2	1.0	16,160.2	4.6	4,918.5	8.1	190,975.0	-0.4
	1987-88	139,547.0	-3.9	24,786.4	0.5	16,255.9	0.6	5,003.4	1.7	185,593.0	-2.8
	1988-89	134,780.0	-3.4	24,821.9	0.1	16,243.8	-0.1	5,076.1	1.5	180,922.0	-2.5
	1989-90	131,886.0	-2.1	24,812.8	-0.0	16,099.3	-0.9	5,134.3	1.1	177,932.0	-1.7
	1990-91	129,962.0	-1.5	24,804.8	-0.0	15,856.9	-1.5	5,178.9	0.9	175,803.0	-1.2
	1991-92	127,607.0	-1.8	24,805.6	0.0	15,559.8	-1.9	5,204.9	0.5	173,177.0	-1.5
	1992-93	124,997.0	-2.0	24,821.1	0.1	15,293.7	-1.7	5,213.5	0.2	170,325.0	-1.6
	1993-94	122,155.0	-2.3	24,770.7	-0.2	15,075.7	-1.4	5,200.2	-0.3	167,202.0	-1.8
	1994-95	119,920.0	-1.8	24,671.8	-0.4	14,871.2	-1.4	5,183.2	-0.3	164,646.0	-1.5
	1995-96	118,187.0	-1.4	24,543.1	-0.5	14,615.3	-1.7	5,157.2	-0.5	162,503.0	-1.3
	1996-97	117,431.0	-0.6	24,420.7	-0.5	14,331.9	-1.9	5,123.8	-0.6	161,307.0	-0.7
	1997-98	116,982.0	-0.4	24,292.8	-0.5	14,065.1	-1.9	5,077.7	-0.9	160,418.0	-0.6
	1998-99	116,793.0	-0.2	24,136.0	-0.6	13,855.1	-1.5	5,016.7	-1.2	159,801.0	-0.4
	1999-00	117,112.0	0.3	24,021.1	-0.5	13,692.5	-1.2	4,969.6	-0.9	159,795.0	-0.0
	2000-01	118,433.0	1.1	23,900.7	-0.5	13,554.5	-1.0	4,912.7	-1.1	160,801.0	0.6
	2001-02	119,908.0	1.2	23,783.1	-0.5	13,426.8	-0.9	4,850.7	-1.3	161,969.0	0.7

TABLE 4-1

SUMMARY OF ENROLMENT PROJECTIONS USING CONSTANT PARTICIPATION RATES
(EXCLUDING VISA STUDENTS BUT INCLUDING CHANGES DUE TO ROSE)

		UNDERGRADUATE				GRADUATE				TOTAL	
		FULL-TIME		PART-TIME		FULL-TIME		PART-TIME			
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
HISTORICAL	1976-77	132,646	0.0	58,373	0.0	12,227	0.0	11,189	0.0	214,435	0.0
	1977-78	130,537	-1.6	65,131	11.6	12,591	3.0	11,630	3.9	219,889	2.5
	1978-79	126,178	-3.3	66,789	2.5	12,400	-1.5	11,383	-2.1	216,750	-1.4
	1979-80	126,398	0.2	70,859	6.1	12,102	-2.4	11,419	0.3	220,778	1.9
	1980-81	129,642	2.6	73,827	4.2	12,214	0.9	11,480	0.5	227,163	2.9
	1981-82	134,629	3.8	77,525	5.0	12,738	4.3	11,354	-1.1	236,246	4.0
PROJECTED	1982-83	141,200	4.9	81,304	4.9	13,460	5.7	11,475	1.1	247,439	4.7
	1983-84	145,327	2.9	84,141	3.5	13,832	2.8	11,618	1.2	254,917	3.0
	1984-85	145,338	0.0	85,912	2.1	14,132	2.2	11,815	1.7	257,196	0.9
	1985-86	141,832	-2.4	87,075	1.4	14,319	1.3	12,043	1.9	255,268	-0.7
	1986-87	138,120	-2.6	88,137	1.2	14,471	1.1	12,287	2.0	253,015	-0.9
	1987-88	133,793	-3.1	88,935	0.9	14,566	0.7	12,498	1.7	249,791	-1.3
	1988-89	129,463	-3.2	89,420	0.5	14,565	-0.0	12,682	1.5	246,131	-1.5
	1989-90	135,125	4.4	89,711	0.3	14,450	-0.8	12,829	1.2	252,114	2.4
	1990-91	139,185	3.0	89,936	0.3	14,247	-1.4	12,943	0.9	256,311	1.7
	1991-92	133,394	-4.2	90,119	0.2	13,995	-1.8	13,009	0.5	250,517	-2.3
	1992-93	126,923	-4.9	90,294	0.2	13,776	-1.6	13,031	0.2	244,024	-2.6
	1993-94	120,031	-5.4	90,221	-0.1	13,598	-1.3	13,000	-0.2	236,849	-2.9
	1994-95	115,126	-4.1	90,008	-0.2	13,428	-1.2	12,961	-0.3	231,523	-2.2
	1995-96	116,876	1.5	89,676	-0.4	13,210	-1.6	12,900	-0.5	232,661	0.5
	1996-97	116,119	-0.6	89,311	-0.4	12,962	-1.9	12,822	-0.6	231,214	-0.6
	1997-98	115,786	-0.3	88,863	-0.5	12,727	-1.8	12,711	-0.9	230,087	-0.5
	1998-99	115,660	-0.1	88,271	-0.7	12,538	-1.5	12,565	-1.2	229,035	-0.5
	1999-00	116,688	0.9	87,826	-0.5	12,391	-1.2	12,453	-0.9	229,356	0.1
	2000-01	118,029	1.1	87,324	-0.6	12,264	-1.0	12,318	-1.1	229,934	0.3
	2001-02	119,465	1.2	86,819	-0.6	12,148	-0.9	12,170	-1.2	230,603	0.3

TABLE 4-2

SUMMARY OF FTE ENROLMENT PROJECTIONS USING CONSTANT PARTICIPATION RATES
(EXCLUDING VISA STUDENTS BUT INCLUDING CHANGES DUE TO ROSE)

		UNDERGRADUATE				GRADUATE				TOTAL	
		FULL-TIME		PART-TIME		FULL-TIME		PART-TIME			
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
HISTORICAL	1976-77	132,646.0	0.0	16,287.3	0.0	12,227.0	0.0	3,729.7	0.0	164,890.0	0.0
	1977-78	130,537.0	-1.6	18,313.7	12.4	12,591.0	3.0	3,876.7	3.9	165,318.0	0.3
	1978-79	126,178.0	-3.3	18,792.6	2.6	12,400.0	-1.5	3,794.3	-2.1	161,165.0	-2.5
	1979-80	126,398.0	0.2	19,925.0	6.0	12,102.0	-2.4	3,806.3	0.3	162,231.0	0.7
	1980-81	129,642.0	2.6	20,655.8	3.7	12,214.0	0.9	3,826.7	0.5	166,339.0	2.5
	1981-82	134,629.0	3.8	21,729.1	5.2	12,738.0	4.3	3,784.7	-1.1	172,881.0	3.9
PROJECTED	1982-83	141,200.0	4.9	22,890.3	5.3	13,460.1	5.7	3,825.1	1.1	181,376.0	4.9
	1983-84	145,327.0	2.9	23,655.8	3.3	13,831.8	2.8	3,872.8	1.2	186,687.0	2.9
	1984-85	145,338.0	0.0	24,107.7	1.9	14,131.9	2.2	3,938.2	1.7	187,516.0	0.4
	1985-86	141,832.0	-2.4	24,372.7	1.1	14,318.6	1.3	4,014.3	1.9	184,538.0	-1.6
	1986-87	138,120.0	-2.6	24,598.6	0.9	14,471.4	1.1	4,095.6	2.0	181,286.0	-1.8
	1987-88	133,793.0	-3.1	24,732.0	0.5	14,565.7	0.7	4,165.9	1.7	177,257.0	-2.2
	1988-89	129,463.0	-3.2	24,769.7	0.2	14,565.1	-0.0	4,227.5	1.5	173,025.0	-2.4
	1989-90	135,125.0	4.4	24,760.4	-0.0	14,449.8	-0.8	4,276.4	1.2	178,612.0	3.2
	1990-91	139,185.0	3.0	24,751.3	-0.0	14,246.9	-1.4	4,314.3	0.9	182,498.0	2.2
	1991-92	133,394.0	-4.2	24,753.2	0.0	13,995.0	-1.8	4,336.2	0.5	176,478.0	-3.3
	1992-93	126,923.0	-4.9	24,771.4	0.1	13,775.7	-1.6	4,343.8	0.2	169,814.0	-3.8
	1993-94	120,031.0	-5.4	24,722.4	-0.2	13,597.6	-1.3	4,333.4	-0.2	162,684.0	-4.2
	1994-95	115,126.0	-4.1	24,624.1	-0.4	13,428.1	-1.2	4,320.4	-0.3	157,499.0	-3.2
	1995-96	116,876.0	1.5	24,495.0	-0.5	13,209.5	-1.6	4,300.1	-0.5	158,881.0	0.9
	1996-97	116,119.0	-0.6	24,372.7	-0.5	12,961.8	-1.9	4,274.0	-0.6	157,728.0	-0.7
	1997-98	115,786.0	-0.3	24,244.4	-0.5	12,727.2	-1.8	4,237.1	-0.9	156,995.0	-0.5
	1998-99	115,660.0	-0.1	24,087.6	-0.6	12,538.2	-1.5	4,188.3	-1.2	156,474.0	-0.3
	1999-00	116,688.0	0.9	23,972.4	-0.5	12,390.5	-1.2	4,150.8	-0.9	157,202.0	0.5
	2000-01	118,029.0	1.1	23,850.9	-0.5	12,264.2	-1.0	4,106.0	-1.1	158,250.0	0.7
	2001-02	119,465.0	1.2	23,731.5	-0.5	12,148.0	-0.9	4,056.7	-1.2	159,401.0	0.7